Journal

IN THIS ISSUE

A.A.N.A. CONVENTION PROGRAM 150

PSYCHOLOGICAL AND PHYSIOLOGICAL CONSIDERATIONS OF THE GERIATRIC PATIENT IN RELATION TO ANESTHESIA
Esther M. Greishheimer, M.D. 163

ANESTHESIA FOR BRONCHOSCOPY AND BRONCHOGRAPHY
George D. Boone, M.D. and Jeanette S. Boone, C.R.N.A. 176

THE USE OF RESPIRATORS IN THE IMMEDIATE POSTOPERATIVE PERIOD
Olive L. Berger, C.R.N.A. 182

ANESTHESIA IN SEVERE MEDIASTINITIS
J. Richard Amerson, M.D. 190

ANESTHESIA AND SURGERY FOR THE ELDERLY PATIENT
Robert P. McBurney, M.D. and Saint Elmo Newton, III, M.D. 193

OBSTRUCTIVE PULMONARY EMPHYSEMA
Jack Cleverdon, C.R.N.A. 199

NOMINATIONS FOR A.A.N.A. NATIONAL OFFICERS 205

BOOK REVIEWS 211

INSURANCE
John C. Maginnis 212

HOSPITAL SAFETY
Harriet L. Aberg, C.R.N.A. 214

LEGISLATION
Emanuel Hayt, LLB 215

ABSTRACTS 217

CLASSIFIED ADVERTISEMENTS 222

INDEX TO ADVERTISERS 227

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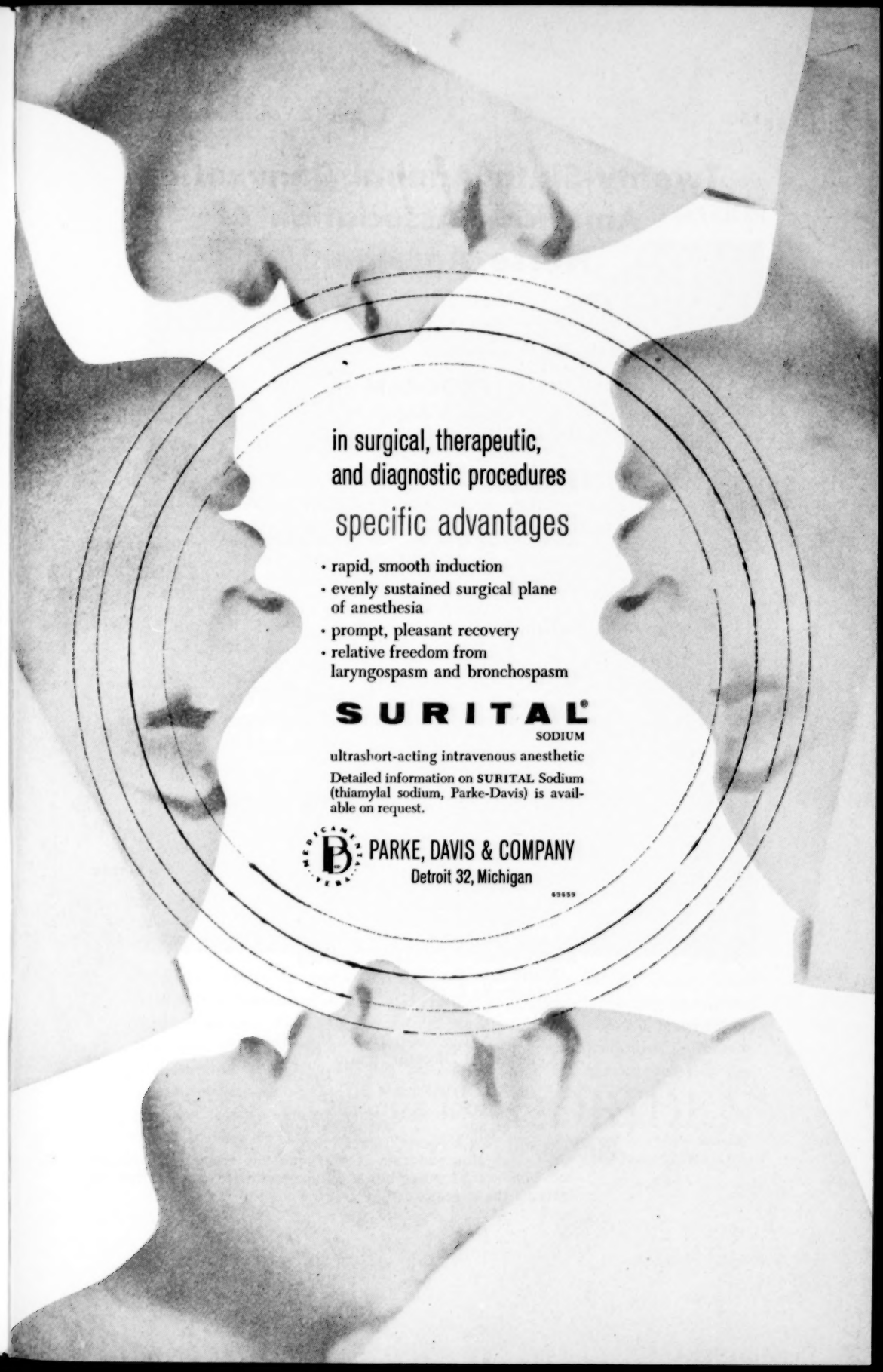
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Twenty-Sixth Annual Convention American Association of Nurse Anesthetists

August 23-27, 1959
New York, N. Y.
Hotel Headquarters — Hotel New Yorker

PROGRAM

Sunday, August 23

8:00 A.M.-5:00 P.M. **Registration**
A.A.N.A. Registration — Terrace Room
Hotel New Yorker

9:00 A.M.-9:00 P.M. **Registration**
A.H.A. Registration — A.H.A. Headquarters
Statler Hilton Hotel

8:00 A.M. **Assembly of Directors of Schools of Anesthesia***
Terrace Room, Hotel New Yorker
Clarene A. Carmichael, C.R.N.A., B.S.
Educational Director, A.A.N.A.
Presiding Officer

Greetings
Olive L. Berger, C.R.N.A.
President, A.A.N.A.

8:00 A.M.-12:00 Noon **Round Table Discussions**
Cameron W. Meredith, Ph.D.
Educational Advisor, A.A.N.A.
Professor of Psychology
University of Illinois
Southern Branch, Alton, Ill.
and
Clarene A. Carmichael, C.R.N.A., B.S.
Educational Director, A.A.N.A.
Discussion Consultants

1:30 P.M. **Distribution of New Material**

2:00 P.M. **Motivation and Clinical Evaluation of Student Anesthetists**
Sister M. Yvonne, Director
School of Anesthesia
St. Francis Hospital
La Crosse, Wis.

3:00 P.M. **Audio-Visual Technics in Teaching**
Major Lacadia M. Clarke
Fitzsimons Army Hospital
Denver, Colo.

4:00 P.M. **Question Box**
Clarene A. Carmichael, C.R.N.A., B.S.
Educational Director, A.A.N.A.
Presiding

DISPLAY
SCHOOL EXHIBITS
First Terrace Terrace Room
Hotel New Yorker

*Although this program is of specific interest to Directors of Schools of Anesthesia, ALL members are invited to attend these sessions.

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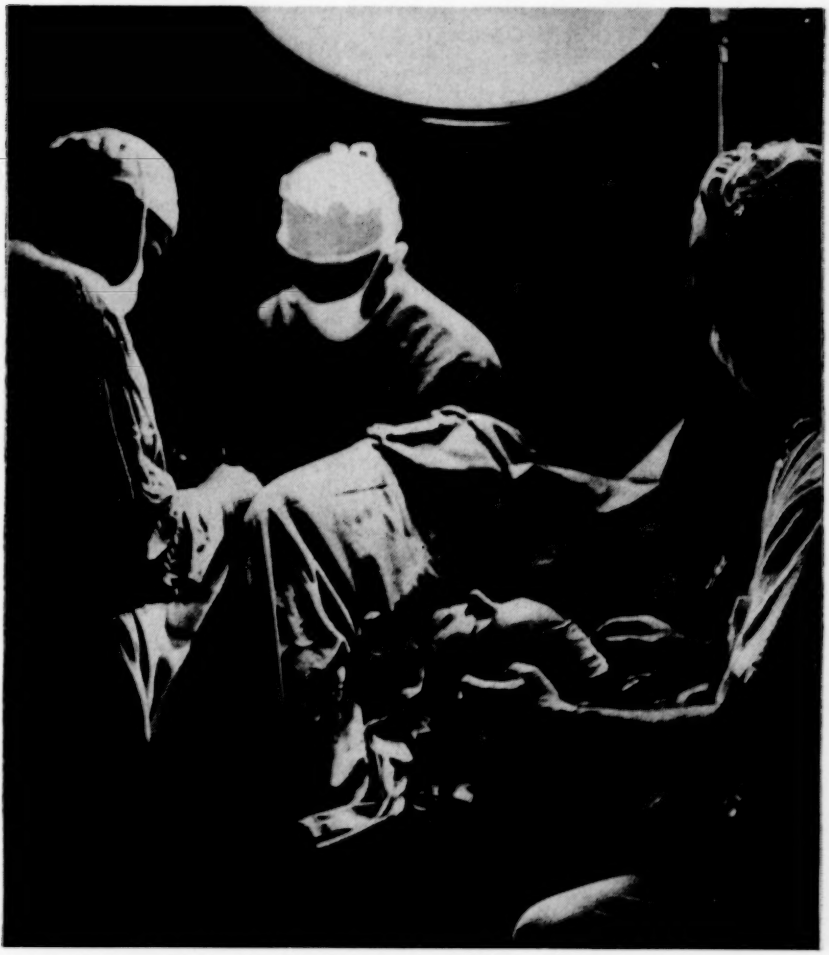

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Monday, August 24

8:00 A.M.-5:00 P.M. **Registration**
A.H.A. Registration, New York Coliseum
A.A.N.A. Registration — A.A.N.A. Booth 2218, 4th Floor, New York Coliseum

9:00 A.M. **Official Opening**
General Session
Meeting Room, 4th Floor, New York Coliseum
Olive L. Berger, C.R.N.A.
President, A.A.N.A.
Presiding Officer

Invocation
Sister Mary de Sales, C.R.N.A.
Rockville Centre, L. I., New York

Address of Welcome from A.H.A.
Albert W. Snoke, M.D.
Immediate Past-President of the American Hospital Association

Address of Welcome
Olive L. Berger, C.R.N.A.
President, A.A.N.A.

9:15 A.M. **Virginia P. Jordan, C.R.N.A.**
President, Connecticut Association of Nurse Anesthetists
Presiding Officer

Dynamics of Group Leadership
Cameron W. Meredith, Ph.D.
Educational Advisor, A.A.N.A.
Professor of Psychology
University of Illinois
Southern Branch, Alton, Ill.

10:15 A.M. **The Nurse Anesthetist as a Leader**
Janet Geister, R.N.
Chicago, Illinois

11:00 A.M. **Precision Balanced Anesthesia**
John S. Lundy, M.D.
Senior Consultant
Section of Anesthesiology
Mayo Clinic, Rochester, Minn.

2:00 P.M. **General Session**
Meeting Room, 4th Floor, New York Coliseum
Catherine McGarry, C.R.N.A.
President, Massachusetts Association of Nurse Anesthetists
Presiding Officer

Cardiac Catheterization of Infants and Children
Betty Lank, C.R.N.A.
Children's Hospital
Boston, Massachusetts

3:00-4:45 P.M. **Panel**
Clinical Anesthesia by Nurse Anesthetists
Lillian G. Baird, C.R.N.A., Conducting

Consultants
Olive L. Berger, C.R.N.A.
Evelyn Auld, C.R.N.A.
Goldie Brangman, C.R.N.A.
Helen M. Geiss, C.R.N.A.
Edward J. Tracy, C.R.N.A.

4:45 P.M. **Introduction of First-time Conventioneers**

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Monday, August 24

6:30 P.M. **State Night Dinner**
Terrace Room, Hotel New Yorker
Kathleen C. Hogan, C.R.N.A.
Chairman, Convention Committee
Presiding Officer

Tuesday, August 25

9:00 A.M. **Business Session**
Meeting Room, 4th Floor, New York Coliseum
Olive L. Berger, C.R.N.A.
President, A.A.N.A.
Presiding Officer
Call to Order
Appointment of Tellers
Roll Call
Report of Approval of Minutes Committee
Reports of Officers
Reports of Standing Committees

11:00 A.M.-1:00 P.M. **Election of Officers**

2:00 P.M. **Business Session**
Meeting Room, 4th Floor, New York Coliseum
Olive L. Berger, C.R.N.A.
President, A.A.N.A.
Presiding Officer
Reports of Standing Committees
Reports of Special Committees
Unfinished Business
New Business

Wednesday, August 26

9:00 A.M. **General Session**
Meeting Room, 4th Floor, New York Coliseum
Elizabeth Wells, C.R.N.A.
Secretary, Vermont Association of Nurse Anesthetists
Presiding Officer
Fluothane—A New Anesthetic
John Abajian, M.D.
Chief of Anesthesia Department
Mary Fletcher Hospital
and
Professor of Anesthesia
University of Vermont Medical College
Burlington, Vermont

10:00 A.M. **Non-explosive Technics of Anesthesia for Infants**
Joseph H. Marcy, M.D.
Children's Hospital
Pittsburgh, Pennsylvania

11:00 A.M. **Hypnosis in Modern Medicine**
Naif L. Simon, M.D.
Director of Anesthesia Department
and School of Anesthesia
Quincy City Hospital
Quincy, Massachusetts

2:00 P.M. **General Session**
Meeting Room, 4th Floor, New York Coliseum
Virginia Armstrong, Chairman
New England Assembly of Nurse Anesthetists
Presiding Officer

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Wednesday, August 26

Endocrine Physiology in Relation to Anesthesia
Ernest A. Sneddon, M.D.
Chief of Anesthesiology
Massachusetts Memorial Hospitals
Boston, Massachusetts

3:00 P.M. **Use of Newer Drugs in Anesthesia**
John Adriani, M.D.
Director, Department of Anesthesia
Charity Hospital
New Orleans, La.

6:30 P.M. **Banquet**
Terrace Room, Hotel New Yorker
Olive L. Berger, C.R.N.A.
President, A.A.N.A.
Presiding Officer

Thursday, August 27

9:30 A.M. **General Session**
Terrace Room, Hotel New Yorker
Bergitte Monahan, President
New Hampshire Association of Nurse Anesthetists
Presiding Officer

The Circulation in Relation to Newer Technics in Anesthesia
Donald B. Hale, M.D.
Head, Department of Anesthesiology
Cleveland Clinic
Cleveland, Ohio

10:30 A.M. **Respiratory Physiology and Air Travel**
Esther M. Greisheimer, M.D., Ph.D.
Research Professor of Anesthesia
Temple University School of Medicine
Philadelphia, Pennsylvania

11:30 A.M. **Unfinished Business**

11:45 A.M. **Adjournment**

1:30 P.M. **Council Session**
Terrace Room, Hotel New Yorker
Florence A. McQuillen, R.N.
Executive Director, A.A.N.A.
Presiding

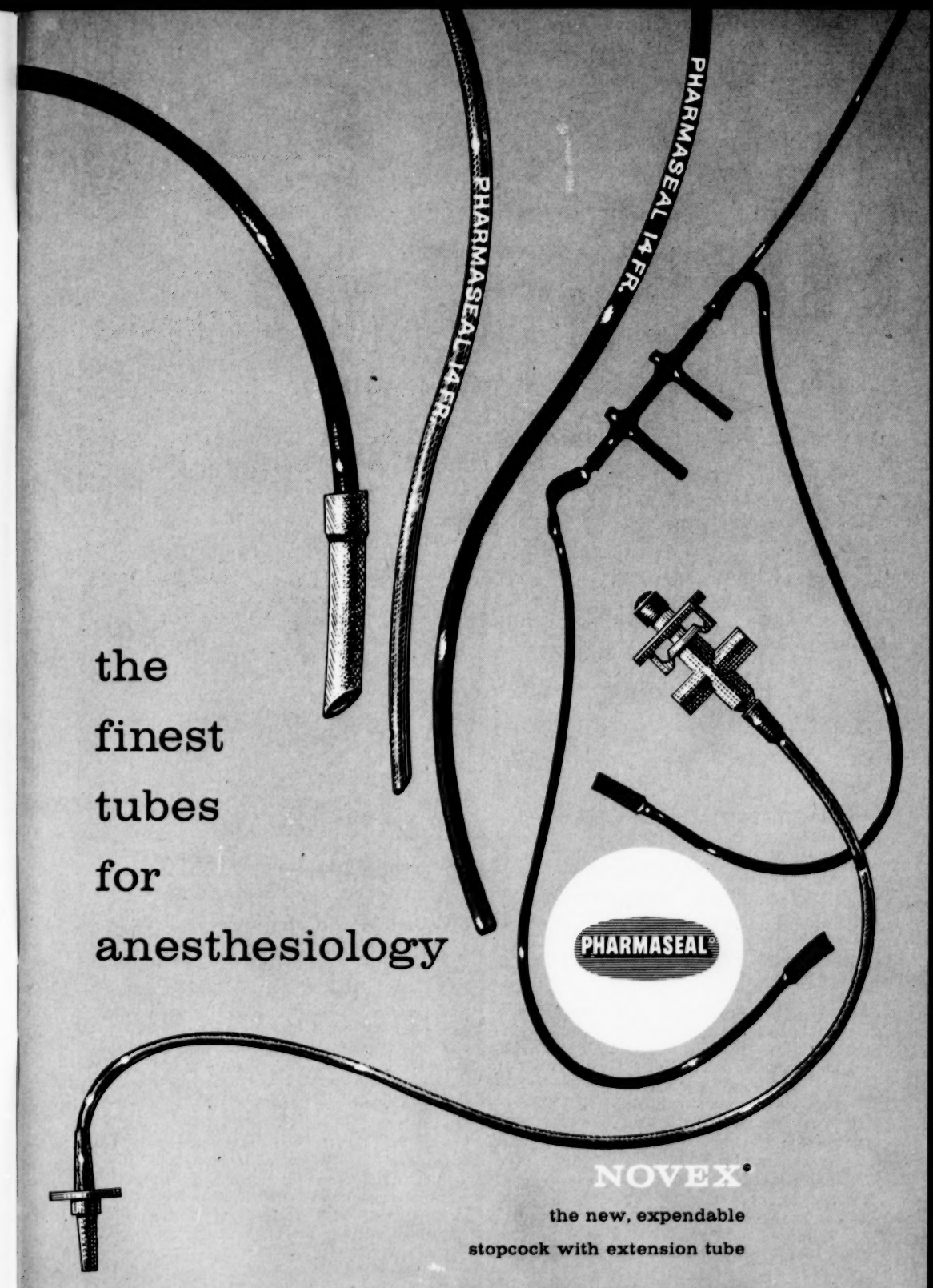
Call to the Convention

As provided for in the Bylaws of this Association, and at the direction of Miss Olive L. Berger, President, we hereby issue this official call to the members for the annual meeting to be held in New York, August 24-27, 1959. The annual business session will be held on Tuesday, August 25, in the New York Coliseum.

Accomplished at the Executive Offices, Prudential Plaza, Chicago 1, Illinois, this first day of July, 1959.

Florence A. McQuillen

Executive Director



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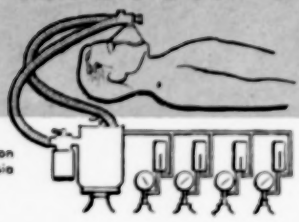

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2. The charge for Service is $32.50 per regular inspection call. You will be invoiced for this charge after each call. Emergency service calls are not included in the Service and will be charged for separately.
3. Additional equipment may be included in this Agreement at any time for an additional charge for Service to be added to the above stipulated price.
4. On our regular inspection call our service representative will inspect, clean, lubricate and adjust the equipment as per the attached procedures. If repairs are needed, he will determine whether they can be properly made on the spot or whether they require factory handling. All on-the-spot repairs are included in the Service. Time parts required will be charged for at list price.
5. It must be understood that, in offering this Service, we are not assuming responsibility for conditions of the equipment which are caused either by accidents, by abuse, or, generally, by causes beyond our reasonable control.
6. If you desire the Service on the basis described above, please indicate your acceptance by signing and returning to us (the white and blue copies of this Agreement. The first Service Year will run from the first day of the calendar month next following the month in which you indicate acceptance, and this Agreement will continue indefinitely until cancelled by either party as of the end of any Service Year by giving at least 30 days' prior written notice of cancellation to the other party.

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TABLE I

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Models	Lime Compartment (ml.)	Void Space (ml.)	Soda Lime (g.)	Time Efficiency* (hrs.)
Mfr. A, Unit 1	635	300	570	3.5
" " Unit 2	440	205	400	3.25
" " Unit 3	540	255	490	3.5
Mfr. B, Unit 1	1230	580	1120	8.0
Mfr. C, Unit 1	500	235	450	
" " Unit 2	1000	470	905	
Ohio 9B	865	405	780	4.0
Ohio 18, 19, metal canister (unbaffled)	2470	1160	2230	17.0
Ohio 18, 19, transparent canister (baffled)	2240	1050	2020	20.0

TABLE II

AIR SPACE, LIME CAPACITY, AND PERFORMANCE OF TWO-CHAMBER CIRCLE ABSORBERS

	Lime Compartment (ml.)		Void Space (ml.)		Soda Lime (g.)		Time Efficiency* (hrs.)
Models	Total	Each Chamber	Total	Each Chamber	Total	Each Chamber	Each Chamber
Mfr. A, Unit 4	830	415	390	195	750	375	3.5
" " Unit 5	2000	1000	940	470	1820	910	8.5
Mfr. D, Unit 1	2120	1060	1000	500	1920	960	9.5
Ohio 20, 21	3000	1500	1410	705	2700	1350	14.0

*Closed system maximum using CO_2 production rate 300 cc. per minute. Double this amount for semi-closed systems which discard expired air before its carbon dioxide is removed.

Note: Data for Ohio No. 9B is based on one compartment only.

carbon dioxide absorption

The following is an abstract of an article by Elwyn S. Brown, M.D. and James O. Elam, M.D., Roswell Park Memorial Institute, Buffalo, New York.

The authors first discuss the need for adding oxygen and removing carbon dioxide from gas mixtures that are used in closed or semi-closed systems of inhalation anesthesia. Soda lime is an excellent carbon dioxide absorbent because of its unique chemical properties.

Doctors Brown and Elam next point out that it is necessary to add an indicator to the absorbent to denote the exhaustion of absorbing capacity. Indicators such as ethyl violet or Clayton yellow are dyes which change color at a pH below 12 and thus are frequently used for this purpose.

The authors then review the methods of using various types of absorbers. The results of their tests are outlined in Tables I and II, above.

Next the article mentions the five rules for packing a canister as formulated by Neff. Finally, the authors caution that trichloroethylene should not be employed with the carbon dioxide absorption technic.

* * *

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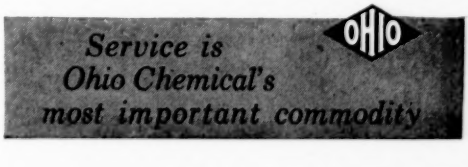

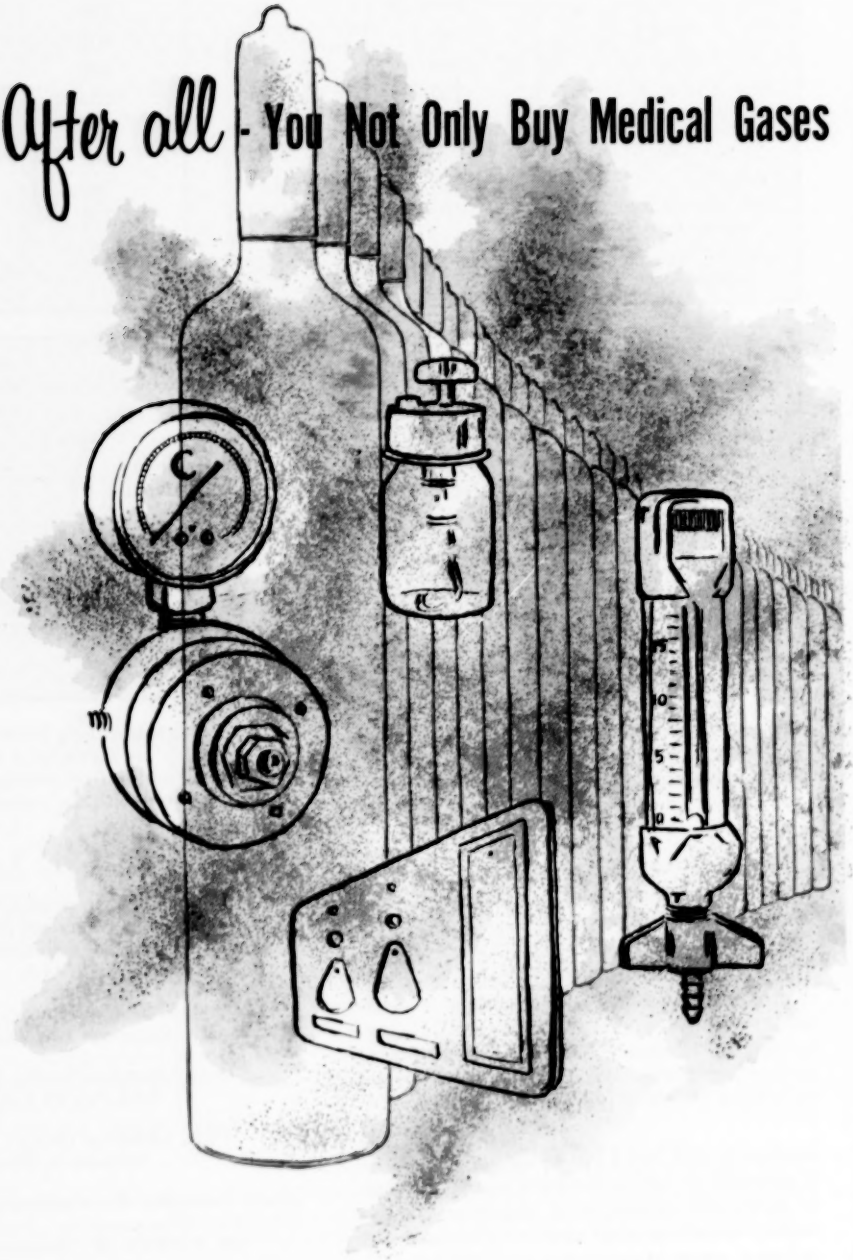
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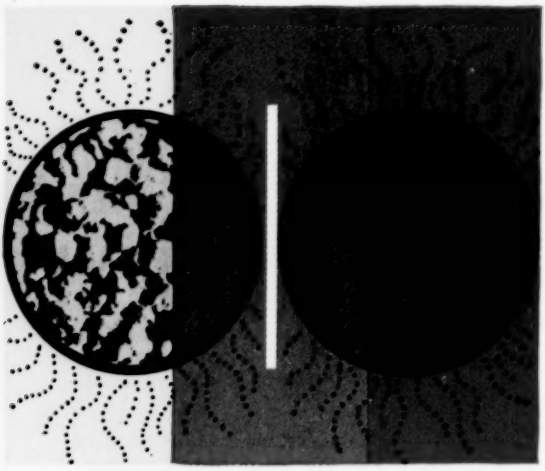

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Psychological and Physiological Considerations of the Geriatric Patient in Relation to Anesthesia

Esther M. Greisheimer, M.D.*, Ph.D.
Philadelphia, Pennsylvania

When the invitation to participate in your Institute arrived it brought me great joy. There are three main reasons for my joy. The first is that I have been interested in nurses almost as long as I have been in teaching, and that is many, many years. The second is that I have been interested in anesthesia for almost as long, and these interests now merge in teaching nurse anesthetists. The third reason is that Minneapolis and The University of Minnesota have been dear to my heart since my first arrival here almost forty-one years ago.

You can now imagine my happiness in coming "home" to a place I love, to be with a group of women in whose profession I have long been deeply interested and for whom I have the utmost respect and admiration.

When the initial excitement of the invitation had run its course, I began to give thought to the subject on which I was to speak, and I realized how difficult, if not entirely impossible it would be for me to discuss psychological considerations of the geriatric patient in relation to anesthesia without giving some attention to the physiological aspect, since emotions affect the physiological functions so markedly. So I immediately obtained permission to include both types of consideration.

When it came to looking up source material, I found that nurse anesthetists have been interested in the psychological aspect of anesthesia for several years, while little emphasis has been placed on this by physician anesthetists, and I commend you for your insight. Of course, some of the same psychological principles apply to younger, as well as to older patients. I shall not deal with definitely psychotic patients, as that would take us into the field of psychiatry, and I am sure that most of your patients are in the "relatively normal" group.

Psychological Aspects

I wish to consider briefly some of the psychological aspects of aging before relating these to anesthesia. One of the most important aspects is work. Some of your patients will still be working, while others will have been forced to stop work. The opportunity to work makes a tremendous difference to the geriatric patient. It is most important in helping one maintain his self-esteem[1]. When the time comes that work must be

---

* Research Professor of Anesthesia, Temple University, Philadelphia.

Presented at the Minnesota Institute for Nurse Anesthetists, Minneapolis, April 23, 1959.

given up, an aged person loses one of the greatest sources of gratification in the whole of life. The feeling of uselessness when one stops working is one of the most common causes of tension and anxiety[2]. Even if one must give up physical work he should continue mental work. If he continues to have intellectual interests, then his capacity for understanding things, his ability to reason and his power of judgment seem to remain at a fairly constant level, despite the ravages of age on his body[3].

A second important aspect of aging is the tendency to become "set" in one's ways. You will surely meet some patients who are very set in their ways, and this process has been aptly called "psychosclerosis" or mental rigidity. It starts early in life in some individuals, and they make themselves and those about them miserable. Fortunately, there are many old people who do not suffer from this condition and they are able to develop new capacities and interests in old age. As one grows old, he really should find it a time of ripened experience and mature wisdom, if only his mind remains alert. It may take real effort on the part of the individual, but if he refuses to make the effort to remain alert and pliable, his attention will most assuredly be directed toward the past, because he is unhappy in the present, and has no future in prospect (1, loc. cit.).

A third important aspect of aging is the tendency to isolate one's self because of impaired hearing and the refusal to wear a hearing aid, even if this device can correct the defect. Life becomes more and more narrow, then these individuals feel "left out". They are unhappy because whenever they see other people talking and looking in their direction, they think they are the subject of discussion.

A fourth important aspect of aging in some individuals is the tendency for the instinct of self-preservation to become dominant and make one too aware of himself. When this happens, he loses his concern for others, and becomes self-centered. He begins to distort reality and exaggerate his ailments, whether they are real ones or imagined ones. Unless he can be made to "snap out" of this emotional quicksand, change his outlook and philosophy, he will sink deeper and deeper into apprehension and depression and disappear from normality.

A fifth important aspect of aging encountered in some patients is "separation anxiety". They may try to conceal it when they enter the hospital, but you will be able to detect it when they express undue concern for the welfare of their relatives, and you may be able to help them overcome it.

These are a few of the things that happen to people as they grow old. It is so much easier to understand the physical aspects of aging than the psychological. Of the latter, the problem of emotional adjustment is the most difficult of all. Despite the great difficulty encountered in this field, there have been some attempts to really measure objectively the effects of emotional tension on the body. The most promising lead I have found involves the measurements of events in skeletal muscles. In order to consider this work, we must consider some of the anatomical relationships of the central nervous system. As afferent impulses come into the central nervous system from various re-

ceptors they travel together until they reach the medulla. At this level the pathway divides. Some impulses go directly to the thalamus by way of the so-called classical pathways; they are regrouped according to modality, and relayed on from the thalamus to specific sensory cortical areas, where they give rise to sensations of touch, warmth, cold, pain, etc. Other impulses leave the classical pathway by means of collaterals, and enter the reticular formation of the brainstem. They are not regrouped in the reticular formation, but are relayed on to all parts of the cerebral cortex, and give the response known as the "alerting" reaction, easily shown by the electroencephalogram. It is these impulses which give "meaning" to the sensations experienced in specific sensory areas. Some of the impulses from the reticular formation reach to so-called "visceral" brain or limbic lobe of the cerebral cortex[4]. This is the primitive cortex of the old brain, and includes the gyrus cinguli, isthmus, hippocampal gyrus, and uncus. It receives olfactory impulses. Not only do impulses pass from reticular formation to the cerebral cortex, but impulses likewise pass from the cerebral cortex back to the reticular formation, and it is those from the limbic lobe and from the orbito-frontal lobe, especially, which seem concerned with emotions. They flow downstream to the hypothalamus, and to the facilitatory and inhibitory areas of the reticular formation. From the hypothalamus impulses are sent on to the visceral efferent or autonomic division of the nervous system, which controls heart, smooth muscle of blood vessels, gastrointestinal tract, etc., and glands. We all know that emotional states are accompanied by changes in heart rate, blood pressure, activity of the gastrointestinal tract, sweat glands, etc. What we are just now beginning to realize is that impulses from the reticular formation also reach somatic efferent neurons and influence the rate of discharge of these neurons. The end result is a change in tone of skeletal muscles of extremities, respiration, and facial expression. These changes in tone and contraction of skeletal muscles during emotional episodes are just as much a part of the physiology of emotion as the changes in heart rate, etc. Not only are there changes in visceral and somatic effectors, but there are also changes indicative of emotional arousal in the cerebral cortex. When we see restlessness, much gesticulation, stiff postures, furrowed brows, and so on, we know that the entire body is involved in expressing emotion. The action potentials which can easily be measured in skeletal muscles vary in an entirely predictable way with the feeling of tension, emotion or anxiety[5].

Let us now get back to the patient. To many geriatric patients the announcement that an operation is essential is a great shock. The reaction to the news varies greatly in different patients. Some are greatly disturbed because of the expense involved. They are living on very limited incomes, and an operation means that they will have to either use up all their reserve or ask for financial aid, and this embarrasses them, and they feel apologetic about it all. You will find this apologetic attitude when you make your preoperative visits.

Other patients look upon the operation as a way "out". They rather hope they will never waken from the anesthetic, as they look upon death

as a release from the problems of old age, especially if they have been lonely. Loneliness, even when the individual voluntarily chooses it, can disturb the mental processes of almost anyone (1, loc. cit.). There may be a definite hope of death if the living conditions are uncongenial or if there is a lack of affection in their lives. You will really have a difficult time when you encounter patients in whom the hope of death is definite.

Some patients look upon the operation calmly, as they feel it really does not matter, one way or another. Their children are grown, married and in homes of their own. Their "affairs are in order", and they have no new goals to attain, consequently, they are equally prepared to live or to die, and the attitude is that of disinterest.

Some patients are reluctant to have the operation, and are resentful. They think the operation is hardly worth while. They weigh the expense and the inconvenience to all concerned against the possibility of continuing to live in rather mild discomfort for their remaining years. They are convinced that they can get along perfectly well without an operation, but their children insist on their having it, consequently, they have a rather resentful attitude.

The anesthetist may have a lot to overcome in any of these groups. Such patients require more assurance of the desirability of life than others, and need much more bolstering of the will to survive[6]. It is a real challenge for the anesthetist to overcome the apologetic attitude, the definite hope of death, the indifferent attitude, or the resentful attitude which she may encounter. If she can overcome these attitudes, she contributes more than anyone else to the elderly patient's morale and recovery.

Let us see what happens after the initial shock of the announcement, that an operation is necessary, has worn off and the patient has finally accepted the idea that an operation is to be done.

At this stage, all geriatric patients may be divided into two major groups. One major group includes those patients who have already had surgical experience. This first major group may then be subdivided into two groups. One subgroup includes those patients whose previous experience was such that they now have no fear or dread of another operation, if only they may have as fine an anesthetist as before. She made a preoperative visit, explained all the procedures to be expected and answered all the questions the patient asked. She gave clear instructions, so the patient knew just what was expected of him. He knew what to expect as he was going to sleep and as he awakened in the recovery room. The going under and the coming out of the anesthetic are the events of the whole experience patients remember most vividly. They are willing to again submit their lives to the complete control of the anesthetist, and it is in no way difficult to make such a surrender when the individual is so competent.

The second subdivision of those who have had previous experience with surgery includes those whose previous experience was a nightmare. There was no preoperative visit, and the surgeon was too busy to discuss anything or answer any questions. One of the following things happened.

(a) The patient was rushed into

the operating room and told roughly to move from the litter to the operating table, with no attention to modesty.

(b) He lay there with bright lights shining in his eyes, and there was much loud talking in the room and clattering of instruments.

(c) He overheard "words" between the anesthetist and surgeon about the choice of anesthetic or manner of administration.

(d) He heard another patient moaning in an adjacent room or corridor, or a child crying, somewhere.

(e) A person hitherto not seen appeared, put something tight on one arm, and roughly appropriated the other arm and placed it on an armboard, stuck a needle in a vein, slapped a mask on his face and strapped it on, without saying a word. This patient vividly remembers a feeling of suffocation and struggle as he was overpowered by the person to whom he was supposed to surrender the safety of his life. He had a feeling of terror that the operation would be begun before the anesthetic had taken effect. There had been no explanations, and no opportunity to ask questions. The whole experience was shrouded in mystery. Waking up in a strange room, with more strangers in attendance, was likewise a difficult experience. It is no wonder that the thought of a second operation strikes fear into the heart of such an elderly patient and he would just about as soon die as go through another such experience.

We come now to the second major group of geriatric patients. This includes those who have had no previous surgical experience, and it may likewise be divided into two subgroups.

The first subgroup includes those patients with near relatives or intimate friends who have undergone surgery. The reports heard will fall into one of the groups listed, according to the experiences recounted. There will be confidence and trust if the experience was agreeable, or fear and dread if the experience was disagreeable.

The second subgroup includes the rare elderly individuals who are the first ones in the family or circle of intimate friends to need an operation, and it seems like a very frightening experience.

Each individual in this group presents a real challenge to the anesthetist. Although she has heard such apprehensions and fears expressed by dozens of patients, she should never let them become an old story to her. The approaching operation is a tremendously important event in the life of such a geriatric patient, as well as a frightening experience. It is the duty of the anesthetist to see that her patients come to the operating room just as well prepared psychologically as they are medically, that is, with anemia corrected, fluid and electrolyte balance adjusted, etc.

It is imperative to make a preoperative visit. This has been recognized for a long time[7], but it is still omitted in some hospitals. The anesthetist should introduce herself and call the patient by name, never "Mom, Dad, Grandmother or Grandfather". She should outline and explain the procedure, induction, maintenance, emergence in the recovery room, etc. She should tell the patient that "store" teeth, glasses, hearing aids, etc. must be left behind. She should permit the patient to ask questions and try sincerely to answer them, no matter how

foolish they may seem to her. Let the patient "talk out" his fears and apprehensions, while she listens politely and attentively. If the patient has incorrect ideas from hearsay or previous experience, this is the time to try to correct such ideas tactfully. The patient should be made to realize that the anesthetist knows what she is doing, that she recognizes him as an individual and cares how he feels and what he thinks about anesthesia. If she is impatient he senses it and becomes depressed. If he is foreign, and does not understand easily, she should try especially hard to get the information across. And she should remember to use lay terms, in case the patient does not understand medical terms.

This is a good time to assure the patient that the operation will not be begun until he is ready from the anesthetic standpoint. He must be assured that he will not be giving away secrets, using obscene language, or behaving improperly, during induction or emergence, as this is one of the things that causes great anxiety to some patients. The anesthetic agents are not used as so-called "truth-serum" is used by psychoanalysts, when the purpose is to have the patient talk freely. Whatever he tries to say during induction and emergence will be so jumbled and muttered that it will not be understood anyway.

The patient should be given suggestions about going to sleep, relaxing, awakening, etc., as he is open to suggestion at this time. I'm sure you all know that operations have been done under hypnotism, due entirely to suggestions given.

During a successful preoperative visit, the anesthetist should allay many of the fears and the anxiety of the patient, inspire his confidence in her ability, and enable him to become willing to rely on her and to entrust the safety of his life to her. She may even have to suggest reasons why he should want to survive, if she notes the death wish or indifference to life and death. It is a big order to overcome the apologetic attitude, the death wish, the indifferent attitude or the resentful attitude. But often, no one else makes it his concern, and if the anesthetist does not do it, the patient will not be properly prepared psychologically. And in this profession "an ounce of prevention is worth a pound of cure".

After a successful preoperative visit, the patient should be able to eat his evening meal, and get some sleep, instead of going without food and being awake all night. He should be calm and refreshed on awakening.

Let us follow his routine on the morning of the operation. The preanesthetic medication should be given earlier than to young patients, as absorption is slower, and a longer time is required for drugs to exert their effects. Unless the patient has been properly prepared psychologically, the preanesthetic medication may not have the expected result. I am still haunted by the vision of abject terror in the eyes of a 12 year old boy, who was brought to the operating room for a congenital heart operation. The internist, the surgeons and the family did not want him to know he was to have an operation at all, consequently there was no preoperative visit by the anesthetist. The preanesthetic medication might as well have been poured into the sink, as it accomplished nothing. He was terrorized at the sight of the operating room. The an-

esthetist tried to comfort him before proceeding. He did not survive the operation. I have often wondered what the outcome would have been had he been psychologically prepared. I hope never to see such terror in a patient's eyes again.

After the preanesthetic medication has been given, the patient is brought either to the induction or operating room. During induction each step of the procedure should be announced quietly to the patient. Remember that if the person is accustomed to a hearing aid, he may not hear you easily, and may seem uncooperative only because of that. Explain the position on the operating table, the venipuncture and intravenous fluid administration. Tell him whether you will put him to sleep by intravenous thiopental or by means of a mask and an inhalation agent. Do this, even if the elderly patient seems calmer and more resigned than a younger one. Continue to explain things until consciousness is lost, so the patient will not be taken by surprise and mentally upset. Tell him when he will feel a needle prick, something tight around his arm, straps across his legs, etc. If you need to move him, do it slowly and gently. Be patient and explain very clearly what you want him to do, as an elderly patient may not easily understand your directions, and just what it is you want him to do, or what you are trying to do. Remember, too, that the geriatric patient has a higher threshold for pain, and he may not complain enough. This means that he may accept a painful or uncomfortable position which really should be adjusted[8].

The anesthetist has a right to be a "prima donna", so far as what goes on in the operating room while she is inducing a patient is concerned. This is the period most likely to leave an unfavorable memory, since during this time fears run riot and mental reactions or dreams may be very vivid. There may be optical and other illusions, and they may seem so real that a form of shock can ensue[9]. This is a time of danger.

One clinical study will be mentioned to show the adverse effects of fear and anger on body functions. This was not done in geriatric patients, but is as applicable to the old as to the young. Two groups of patients undergoing dental extractions or minor operative procedures were equally well prepared medically. But only one group was properly prepared psychologically. Eighty per cent of nitrous oxide and twenty per cent of oxygen were administered. In the psychologically prepared group, both induction and maintenance were smooth, and no cyanosis was present in any individual.

The other group was purposefully subjected to mental stress of one of the following kinds: (1) they were unjustly reprimanded for being early or late, or even told that they were there on the wrong day; (2) they were kept waiting unduly long; (3) they were rushed unceremoniously into the operating room; (4) they were subjected to some kind of turmoil in the operating room, such as curt remarks made by the surgeon to the anesthetist, a view of instruments, a clattering of instruments, loud voices during induction, as if ignoring the fact that hearing is the last sense to be lost. In this stressed group, both induction and maintenance were stormy and marked cyanosis was present in each patient. Even recovery was not smooth[10].

It is possible for a patient to die of fright, probably due to ventricular fibrillation of psychogenic origin[11]. The first patient on whom Simpson planned to use chloroform died on the table before one drop of chloroform had been administered (quoted by Raginsky, loc. cit.). Some patients "crumple" up just as surgical anesthesia is reached. The patient suddenly collapses, despite the fact that the operation has not started and overdose of anesthetic is impossible. This may happen in patients who are in a real panic and in those without the will to live. We recently had a cardiac arrest in a young woman physician who was to have a small thyroid nodule removed. The endotracheal tube had just been inserted, and no physical reason for the arrest could be determined. I presume the fact that she was a physician led the anesthetist to suppose that she would not need reassurance, when she was probably literally scared to death. Fortunately, the quick action of anesthetist and surgeon who was scrubbing saved her life. If such a disaster can happen to a young person who supposedly knows just what is going on, imagine how much more likely it is to happen to a scared elderly person who understands very little of what is taking place.

There are some particularly difficult types of patients to handle. One type is the "business executive" (or even a physician or teacher) who has been in a position of authority, always telling others what to do, but never submitting his will to others. Another difficult type is a "pampered" person, who has been used to having his or her own way and never doing as others request. A person who has never known discipline is also difficult. Individuals with poor moral control are anesthetic problems, probably because they fear they might say or do something not acceptable as they are going under anesthesia or emerging from it[12].

Of all the emotions the anesthetist meets in her geriatric patients, anxiety is undoubtedly the most frequent. The patient has an uneasy feeling that something terrible is about to happen[13], and he may experience anxiety in one of three ways. The first is to do a lot of complaining about things, but there are really no changes in autonomic functions. The second is to do no complaining, but to show marked changes in heart rate, blood pressure, gastrointestinal activity, etc. The third is to complain, and at the same time to show autonomic and even somatic changes. The second is the one we may overlook, and it is the most dangerous of the three. The treatment of anxiety demands a lot of understanding, common sense and courage. It should be looked upon as a symptom suggesting a mental disturbance, just as fever suggests organic disturbance. We should keep in mind that the anxious patient is no more to blame than the one with fever, and be just as considerate of the former as the latter. The anxious patient particularly needs an anesthetist he can trust and in whom he can feel great confidence, and one who reassures him that all will be well. It is of no use to tell the elderly patient that hundreds of patients come through surgical operations safely every day, as he is governed by emotion, and not by reason[14].

I think the anesthetist should make a postoperative call on her patients before they leave the hospital and

see what they have to say about the conduct of the anesthesia. She may learn a great deal and be able to avoid making the same mistake over and over again, or she may gain self-confidence and assurance which act as a tonic, and help her in her daily task.

Physiological Aspects

I wish now to devote some time to the physiological considerations of the geriatric patient. We shall consider the heart first. The aged heart possesses less reserve and less ability to adjust to stress than the young heart. Coronary sclerosis is frequent, and there is usually some atrophy of the myocardial fibers. There is delay in the recovery of excitability in the aged heart muscle, and it is more susceptible to arrhythmias. The cardiac output is less than it is in the young, and there is less ability to increase it during periods of stress.

If there is fear, anxiety or pain, the adrenal glands increase their output of epinephrine and the effects are the same as if one injected epinephrine, or if there were widespread stimulation of the sympathetic (thoracolumbar) division of the nervous system. Tachycardia is one of these effects, and in particularly susceptible hearts, it can progress to arrhythmias and even to ventricular fibrillation. Cardiac arrest is reported to be 20 to 30 times as frequent in the aged as in the young[15].

Blood pressure should be mentioned. Degenerative arterial disease is frequent in geriatric patients. This means that the large arteries are less elastic as one grows old. The systolic blood pressure tends to be high, and the peripheral resistance high. The circulation is slower, and it takes a longer time for drugs to exert their effects. The circulatory system loses its compensatory power, just as does the heart, and there is a narrow range of adaptation to stressing situations.

Hypotension should be avoided for two main reasons. The first is that there is danger of thrombosis. It is easy for this to occur when the rate of blood flow is slow and the pressure low, since the blood tends to stagnate. The second reason is that during hypotension the supply of oxygen and food to vital organs is curtailed, and waste products tend to keep on accumulating in the tissues. In other words, the tissue fluid which lies between the blood in the capillaries and the cells of the tissues, is not freshened as it should be.

The cortical cells of the brain can easily be damaged during periods of hypotension, and although the patient survives the operation he loses the ability to use his mind, and we say he has become a "vegetable". He never regains consciousness, even though he may continue to live for weeks or even months. Cerebral hemorrhage can occur even during hypotension, due to the sclerotic changes in the cerebral vessels. During periods of hypotension the liver and kidneys lose the ability to carry out their respective functions properly, and although the patient survives the operation, his life terminates soon due to anuria and accumulation of waste products or uremia.

Hypertension should likewise be avoided. The principal danger in this situation is intracranial hemorrhage or stroke. It is a very sad experience to find that a stroke has occurred during the period of anesthesia[16], and the patient who could walk and talk before the operation may now be able to do neither.

The blood volume of the geriatric patient is likely to be low. This can lead to disturbances in both fluid and electrolyte balance, and increase the patient's susceptibility to hemorrhage[17], and although this is not the anesthetist's responsibility, it can make her task more difficult as it favors acidosis.

Anemia is common in elderly patients, and the anesthetist has a right to demand that this be corrected before the anesthetic is administered.

The skeletal system of the geriatric patient may present some difficulties. There may be deformities which make positioning a problem. As one ages there is diminished bone production, due not only to endocrine and metabolic deficiencies, but also to a decrease in the vascular supply and comparative inactivity of the patient (8, loc. cit.). It may be almost impossible to arrange the desired position on the table due to both deformities and arthritis. The full cooperation of the patient is essential, and the anesthetist may need to put forth more effort and care than usual.

The respiratory system undergoes many changes with age. There is likely to be rigidity of the thoracic cage due to calcification of the costal cartilages[18]. The lung tissue shows an increase in fibrous tissue with corresponding loss of elasticity.

Senile emphysema is often present and the alveoli may be dilated and many alveolar septae ruptured. There is decreased permeability of the alveolar membranes, and this is responsible for the longer induction and recovery periods noted. The bronchioles are narrowed, and the intrapulmonary mixing of gases is inefficient; this favors both hypoxia and hypercarbia. Geriatric patients are highly susceptible to both of these conditions[19].

There is decreased vital capacity and total lung capacity. The ratio of residual air to total lung capacity rises progressively, as one ages, which means that ventilation becomes more and more inadequate.

The cilia on the mucosa of the upper respiratory tract are less vigorous in their activity, and the respiratory secretions are less promptly and efficiently removed[20, 21]. The depression of the respiratory center due both to preanesthetic medication and anesthetic agents causes more difficulty during anesthesia than one finds in young patients, especially in adverse positions. It is usually essential to assist or control respiration to insure adequate ventilation, as the respiratory center is too depressed for adequate spontaneous ventilation. One of the most important duties of the anesthetist is to make sure that ventilation is adequate in order to prevent damage to the brain, heart, liver and kidneys from hypoxia.

There are many changes in the nervous system with age. The cerebral blood vessels show sclerotic changes. The vascular resistance of the brain is increased and the cerebral blood flow slower. This is responsible for the fact that the geriatric patient is slower to understand directions and to comply with requests[22]. The decline in memory so prevalent in the aged may be attributed to the fact that the brain receives less oxygen as its circulation slows and its metabolism is less active (3, loc. cit.) than before.

The relation between nervous system and certain endocrine glands is important. The thoracolumbar au-

tonomic nerves supply the adrenal medullae. This is a reciprocal relationship; the nerve impulses increase the output of epinephrine, which, in turn, has the same effect as stimulation of the thoracolumbar nerves. The epinephrine reinforces and prolongs the effect of sympathetic stimulation.

There is also a connection between the nervous system and the cortex of the adrenal glands, but this is very "round about". It involves the hypothalamus and the pituitary. When the hypothalamus is stimulated, it releases a neuro-endocrine material, the nature of which is unknown at present. This material reaches the anterior portion of the pituitary gland by way of a second arterial supply between hypothalamus and pituitary, called the "portal" system. When it reaches the anterior pituitary, it stimulates the production and release of ACTH. This, in turn, enters the blood stream and is carried to the adrenal glands, where it stimulates the cells of the adrenal cortex to increase the production of steroids, especially of the corticoid group. This increased production of corticoids is one of the main responses to any type of stress, including emotional stress.

Experimental work has shown that stimulation of the anterior portion of the hypothalamus arouses a feeling of fear and anxiety and increases the output not only of corticoids, but also of epinephrine. Stimulation of the posterior portion of the hypothalamus arouses a feeling of rage and anger, and increases the output of norepinephrine[23]. The picture of inter-relationships between brain and endocrine glands is very confusing at present, but intensely interesting. There is also a whole new field opening up, between cortical functions, reticular formation and drugs; this is called psychopharmacology. We are living in a rapidly moving medical age.

One other endocrine gland is involved in anxiety. This is the posterior lobe of the pituitary, and the hormone involved is called the antidiuretic hormone. Its presence in the urine in larger amounts during anxiety has been noted.

By indirect evidence, we know that the liver is involved. One of the tests done for liver function is administration of sodium benzoate by mouth. This is conjugated in the liver and excreted as hippuric acid. When one is anxious the output of hippuric acid is decreased which means that the liver is unable to perform one of its functions properly under emotional stress.

The kidneys are less efficient in the geriatric patient. The renal blood flow is reduced, the glomerular filtration is decreased, and the function of the distal tubules is impaired. When one is subjected to hypoxia, oliguria or even anuria results. Due to the changes in the kidneys with age, the elimination of drugs is slower, and their effects last longer than in the younger patient.

Conclusion

It is always difficult to bring a speech to a close. It seemed fitting to me to formulate what I have called a "creed" for the nurse anesthetist. It is really based on what I have observed as I have worked in anesthesia, with you.

"I will make a preoperative visit on my patient, and during it I will endeavor to accomplish the following, no matter how unattractive and irascible the patient may be, keeping in

mind that one of my own family may be in a similar situation, or that I myself might be here when I am old.

1. To relieve fears and anxieties in so far as possible.

2. To explain the procedures of the day of operation, clearly, so they will be easily understood.

3. To permit the patient to ask questions and attempt to answer them courteously, no matter how absurd or foolish they may seem to me.

4. To make the patient feel confidence in me, and to know that I am interested in him as an individual.

5. To prepare him psychologically by these means, and in any other way I can think of.

During induction I will attempt to protect the patient from disturbing sights and sounds, and will explain what I am doing and what I would like him to do, continuing to give him reassurance until he is asleep and ready for surgery.

During maintenance I will try to keep his vital functions as normal as possible, watching the blood pressure and pulse closely and assisting the respiration when necessary. I will not permit anyone or any event to take my attention from the responsibility at hand. I will inform the surgeon of any important change in the vital functions of the patient. I will keep in mind that I am part of a team, the members of which are working as a unit to save the life and improve the health of the patient. I will do all in my power to carry the patient safely through the ordeal, remembering that help and guidance are available to me, if I ask for them, from a divine source that never fails.

I am proud of my profession, which gives me an opportunity to be of real service, and I will maintain its high standards and keep informed of important advances in the field".

Finally I wish to read a letter from a grateful patient.

Dear Miss Larson: I have had lots of time to think since I came home from the hospital ten days ago, and the thing that stands out most prominently in my mind is meeting you. I just had to write to tell you what a satisfying experience it was to have you for my anesthetist. I hope you won't mind, and please forgive my wordiness, but you know how old ladies are, once they start to talk.

I was so upset when my doctor told me I needed an operation; just imagine, an operation, at my age! I stopped teaching about fifteen years ago, and have been living on a pension since. I did not know how I could pay all the bills until the Minister told me that I could use the hospital room endowed by our Church, and that relieved my financial worry, but I was still just plain scared about all that I imagined might happen in the hospital.

When you came to see me it seemed just like I had found a new friend. You called me by name and you told me your name, and said that you would be putting me to sleep for my operation. You asked me some questions, but best of all, you explained everything so clearly, and then you let me ask you such a lot of questions. They must have seemed foolish to you, but you did not let on, if you thought so. You patiently answered them, and in terms that I could understand. I felt so much better after your visit that I could really eat and enjoy my supper that night and after I took the pill you said the nurse would give me, I went right to sleep and had such a good rest.

The next morning I found myself actually looking forward to seeing you, and I no longer felt afraid of the operation. You were so gentle with me, and so kind and understanding. I felt confidence in you and I knew that with you in the operating room looking after me everything would be all right. I just dropped off to sleep so easily, and sure enough, just as you said, the next thing I knew, I was

waking up in another room, which you had called the recovery room, and another nurse was taking good care of me.

It meant so much to me that you took care of me, and told me just what to expect. I had hoped so much that you would drop in for a chat before I left the hospital, as I wanted to tell you how much I appreciated all that you did for me. I want to say "Thank you" for your kindness and understanding. I hope that if you ever need an operation you will have as fine an anesthetist as I had. May God bless you in your splendid work, and give you the health and strength to continue for many years, and give you His unfailing help whenever you ask for it.

With appreciation,
Nellie Swenson

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Anesthesia for Bronchoscopy and Bronchography

George D. Boone, M.D.*
and Jeanette S. Boone, C.R.N.A. †
Tucson, Arizona

Introduction

Bronchoscopy and bronchography, performed with local anesthesia, are frequently formidable procedures—both for the patient and the physician.

This presentation details the technique for the use of intravenous thiopental (Pentothal® Sodium) and succinylcholine chloride (Anectine® Chloride) in a series of 1800 bronchoscopies and 600 bronchograms, performed at a Tucson, Arizona Hospital since early 1952.

It is to be emphasized that the various technical factors involved are still under study. At this time the procedure is not recommended for general use.

Historical

Since Chevalier Jackson devised the bronchoscope, local anesthesia has been employed by most bronchoscopists and in the making of most bronchograms.

Since Lundy first used intravenous thiopental as an anesthetic agent in 1935, this ultra-rapid drug has enjoyed an increasingly broad application.

When succinylcholine, with its curariform-like action became available in 1949, the indications for intravenous thiopental were considerably extended.[1, 2]

To our knowledge no one has reported a large series of cases utilizing these agents as intravenous anesthesia for bronchoscopy and bronchography.

In 1956, Boone[3] reported a series of 600 cases using the technique described here. Since then there have been a number of revisions and improvements.

Rationale

The choice of an ultra-rapid barbiturate for narcosis and/or amnesia in combination with a controllable muscle relaxant seemed a logical one.[4]

It remained for experience to prove whether such a combination when applied to bronchoscopy and bronchography would be free of mortality and of low morbidity.

At this time it may be stated that, when properly used, the procedure is both advantageous and safe. There has been no mortality and no serious morbidity.

Choice of Patients

In the beginning the method was used only on the better-risk patients. As experience accumulated, the indications were extended to include such poor-risk patients as: status asthmaticus, advanced pulmonary emphy-

* Thoracic Surgeon, Senior Staff, Tucson Medical Center.
† Past President, Arizona Association of Nurse Anesthetists.
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sema, and other conditions characterized by varying degrees of cardiopulmonary failure.

Thiopental

The use of the term "Anesthesia" in the title is a misnomer since, in this study, thiopental has been used only in such amount as required to obtain narcosis and/or amnesia. In such amounts the relative and absolute contraindications have been considerably lessened.

It was well known that thiopental, being a respiratory depressant, was contraindicated in asthmatic and emphysematous patients with low blood-oxygen tension and high carbon dioxide tension.[5]

Our experience has been that such patients can be safely carried through the procedure.

The hiccough, laryngospasm, and coughing, described as resulting from thiopental, have been largely avoided by the intravenous administration of atropine at the beginning of the procedure.

The danger of removal of the anoxic stimulus to respiration by the administration of oxygen has been largely obviated by the use of smaller amounts of thiopental, the maintenance of airways and by various procedures of oxygenation as described below.

Careful preanesthetic evaluation and the use of intravenous atropine have avoided significant disturbances of cardiac rhythm or capacity.

The lowering of intrathoracic venous pressure and the obtunding of the vasomotor response to hypotension have occurred to no apparent, significant degree in this series. There has been no clinical evidence of disturbance of renal or hepatic function.

Certain postanesthetic symptoms, attributable to patient "idosyncracy" such as: "hang-over" excitement, or pain, have been infrequent, mild and transient.

At the present time, the following absolute contraindications are observed: marked barbiturate idiosyncracy, impaired kidney or hepatic function, hyperthyroidism, uncontrolled diabetes mellitus, severe anemia, porphyria, advanced congestive heart failure, shock, and severe hemorrhage.

Succinylcholine

In this series there have been no apparent severe ill effects from succinylcholine and no apparent evidence of bronchoconstriction or other evidence of liberation of histamine.

In an occasional patient, there has been a transient stimulation before neuromuscular depression, or a transient muscular spasm at the time of maximal effect.

In the instances where the administration was too rapid, muscle fasciculations or postanesthetic muscle soreness have occurred.

No significant alterations in blood pressure have been noted.

Salivation has been prevented by the preanesthetic use of atropine.

Since succinylcholine is destroyed by rapid enzymatic hydrolysis, mainly by nonspecific plasma cholinesterase, substances which inhibit cholinesterase (neostygmin) or which compete with succinylcholine for the enzyme (procaine) are contraindicated.

Succinylcholine is used with great caution in any condition in which plasma cholinesterase activity is reduced, such as: severe liver damage, malnutrition, etc.

Atropine

The judicious use of intravenous atropine is important and is to be emphasized.

Its chief use is to reduce the frequency of bradycardia or systolic arrest with unusually active carotid sinus reflexes.

In this series 1/150 grain of atropine sulphate was given intravenously before or immediately after the initial injection of thiopental. If necessary, an additional 1/300 grain is given during the course of the procedure. There has been no significant drying effect on bronchial secretions.

Oxygen

The careful use of oxygen is of paramount necessity. The poor risk patient is given oxygen before thiopental is injected. Oxygen is administered by a closely fitting mask, with manual compression of the bag, until maximal oxygen saturation is obtained.

After the introduction of the bronchoscope, 100 per cent oxygen is given through the side-arm of the bronchoscope at 8 to 10 liters per minute. Frequently, additional oxygenation is obtained by intermittent obstruction of the proximal end of the bronchoscope, with the operator's thumb.

When bronchography is performed, the patient is well oxygenated following withdrawal of the bronchoscope and, after insertion of the endotracheal tube. At the completion of either procedure, oxygenation is continued until the patient begins to react, or longer, if needed.

Preanesthetic Medication

In preanesthetic medication, the use of morphine is avoided. Usually, 25 to 75 milligrams of meperidine (Demerol®) are given intramuscularly, one hour before the procedure. Oral intake is withheld after midnight. If the patient has received corticosteroids, 100 milligrams of hydrocortisone are given intramuscularly on the preceding evening and repeated one hour before the procedure.

Occasionally an asthmatic patient requires 10 to 20 c.c. of aminophylline intravenously before and/or during the procedure.

Postanesthetic Medication

An occasional patient requires 25 milligrams of promazine hydrochlorede (Sparine®) intramuscularly for nausea. Rarely is it necessary to give 10 to 20 milligrams of Meperidine intravenously for excessive coughing or excitement.

Technique

The operative team consists of the bronchoscopist, the anesthesiologist or nurse anesthetist, a number one and a number two nurse and an x-ray technician, (when bronchography is done). The bronchoscopist directs the overall pattern of the procedure. The number one nurse assists the bronchoscopist and instills the opaque medium at bronchography. The number two nurse holds the head at bronchoscopy and assists in positioning the patient during bronchography.

Bronchography is always preceded by bronchoscopy. This is advantageous in cleansing the bronchi for better distribution of the opaque medium, as well as diagnosis and therapy.

The infusion set consists of a 20 c.c. syringe with a three-way petcock attached via a short plastic tube to a 20 gauge needle.

The flask of succinylcholine, suspended from an adjustable intrave-

nous stand, is connected to the petcock with plastic tubing.

The syringe is filled with 2½% thiopental solution. The needle is inserted into a vein, in either forearm, and both needle and syringe are firmly affixed to the forearm with one-inch width strips of adhesive. The forearm is then securely strapped to the armboard.

Induction is accomplished by injecting 5 to 10 c.c. of thiopental solution, depending upon the patient's weight and the usual anesthetic variables.

In the very severely ill patients, as little as 2 or 3 c.c. of thiopental solution have been used. The minimal amount of solution necessary for amnesia is injected.

The one-tenth of one per cent (0.1%) solution of succinylcholine is then allowed to run at 40 to 50 drops per minute, more or less being given according to the requirements of the patient and the procedure. Oxygenation is maintained as previously described. As a rule, during the bronchoscopy, voluntary breathing is stopped only during the introduction of the bronchoscope.

However, if the procedure is prolonged, diaphragmatic excursions may be initiated from time to time, by slowing the succinylcholine drip.

In bronchography, all voluntary respiration is suspended until the termination of the procedure.

Coughing and straining, to deliver bronchial secretion to the range of the bronchoscope, may be continued for long periods with considerable respiratory activity and with complete amnesia.

As needed, 3 to 4 c.c. of thiopental solution may be injected intermittently to maintain amnesia.

The flow of succinylcholine may be altered to obtain the degree of muscular relaxation required.

If the bronchoscopy is prolonged and bradycardia develops in spite of the respiratory techniques described above, the scope is withdrawn, the patient is re-oxygenated by the anesthesiologist or nurse anesthetist, and the scope is again introduced.

If bradycardia seems to be due to a vago-vagal reflex, 1/300 grain of atropine is given via the intravenous tube.

If bronchial secretions obstruct the airways and the patient's cardiopulmonary status is poor, he is intubated, suctioned, thoroughly oxygenated and the bronchoscope again passed.

When bronchography is planned, the procedure is carried out with the patient supine on the horizontal fluoroscopy table. Before the bronchoscope is withdrawn, a 36 inch segment of a size 16F K-10 Kaslow plastic stomach tube is passed through the bronchoscope into the left mainstem bronchus.

After withdrawal of the bronchoscope, this tube is cut off 3 or 4 inches distal to the mouth. This serves for instillation of opaque medium into the left bronchial tree and, for aspiration of the medium after bronchography is completed.

Following bronchoscopy, the anesthesiologist or nurse anesthetist inserts a cuffed endotracheal tube and the cuff is inflated.

A bite block is placed between the teeth. A strip of adhesive, with each end bifurcated (for several inches), is passed around the neck and the ends secured to the bite block and endotracheal tube.

The oxygen system is attached to

the endotracheal tube and manual compression of the breathing bag resumed. A similar segment of Kaslow plastic tube, 18 inches in length, is passed through the orifice of the nipple of the right angle endotracheal connector.

This tube passes naturally into the right mainstem bronchus and serves for instillation of opaque medium into the right bronchial tree; also, for aspiration of the medium after completion of bronchography.

The presence of this second Kaslow tube in the right mainstem bronchus is insured by fluoroscopic vision. Hereafter, the bronchoscopist directs the instillation of the opaque medium under fluoroscopic observation.

The right bronchial tree is filled first and the required number of Bucky roentgenograms are made. This procedure is then carried out for the left bronchial tree.

Experience teaches that the bronchoscopist obtains quite satisfactory filling of each bronchial tree. In the presence of localized or general impairment of pulmonary dynamics or with bronchospasm or bronchostenosis, the opaque medium may not be distributed uniformly. This necessitates repositioning of the patient and/or instillation of more opaque medium.

Frequently, added pressure on the oxygen bag at this point is helpful.

Coincident with instillation of opaque medium and until the bronchographic exposures are made, the anesthesiologist or nurse anesthetist maintains only shallow respirations by gentle pressure on the bag.

This avoids filling of the alveoli with opaque medium. When adequate filling has been obtained and the x-ray technician is ready for a Bucky roentgenogram, the anesthesiologist or nurse anesthetist exerts firm pressure on the filled oxygen bag, stopping all respiratory motion at full inspiration.

At a signal from the anesthesiologist or nurse anesthetist, the technician makes the exposure.

Studies with the oscillograph reveal a marked bradycardia during this period. This has proved to be of no hazard and is only momentary.

The bradycardia is conducive to technically better roentgenograms with no blurring from heart action. If desired, a post-tussive roentgenogram is made after the patient awakens.

When bronchography is completed, the endotracheal tube and the Kaslow tubes are left in situ for repeated suctioning.

When the patient reacts sufficiently, the tubes are removed and the patient, accompanied by the anesthesiologist or nurse anesthetist, is carried to the recovery room. The average patient reacts within a very few minutes.

Precautions

This procedure should be performed only in the hands of a skilled and trained individual. It is not one that may be learned by reading about it.

Patent airways must be maintained at all times. Whenever cyanosis impends, oxygen must be used even more freely.

Oxygenation in some form must be maintained throughout the procedure.

Tracheal intubation and the introduction of the bronchoscope must be done quickly and easily. Due regard for the judicious use of atropine must

be observed. Excessive preanesthetic medication with narcotics must be avoided. "Team work" is of the essence.

Summary

A continuing study of a technique for intravenous thiopental-succinylcholine anesthesia in bronchoscopy and bronchography has been presented.

A series of 1800 cases in which this procedure was used has been reported. The contraindications and precautions have been listed.

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The Use of Respirators in the Immediate Postoperative Period

Olive L. Berger, C.R.N.A.*

Baltimore, Maryland

Respirators for use during surgery have been an important part of the anesthetist's armamentarium for approximately five years. As they have developed, the respirators have been adapted for wider and wider usage in the operating theater, until today there is scarcely a hospital of any size without one. The many technical refinements and the adoption of new principles of operation have led the anesthetist into extending the scope of respirator usage to areas outside of surgery.

Bjork has described the use of a respirator postoperatively in 61 surgical patients who had had pulmonary resection for tuberculosis.[1] These patients were kept on the Engstrom respirator for periods varying from a few hours to several days immediately postoperatively. Avery, Mörch, and Benson described the use of a respirator for the treatment of crushed chest syndrome.[2] Recently, Spencer, Benson, and Bahnson reported the use of respirators following cardiac surgery.[3]

The occasional need for respirators in the immediate postoperative period is obvious to anyone who has spent any time in a recovery room. The extent of surgical operations, especially in the chest, not infrequently produces pulmonary insufficiency by (1) marked reduction in ventilating area and (2) a physiological splinting because of severe pain. Patients who have marginal pulmonary reserve, who must have surgery, are frequently found to have inadequate respirations immediately postoperative because of a temporary inability of some damaged lung tissue to take part in respiration, or a temporary weakness of the respiratory muscles because of surgical intervention or anesthesia toxicity. The failing heart, whether it be from surgical or other causes, is frequently helped by the use of an intermittent positive pressure respirator which reduces pulmonary edema or reduces the respiratory effort to such a point that it is tolerable to the patient. It would be unfair to leave out the inherent toxicity of anesthetic drugs, either from depression or myoneural blockade, that produce latent or continued inadequate respiration because of their effects. The use of a respirator in these instances is, of course, mandatory.

* Chief Nurse Anesthetist, The Johns Hopkins Hospital and President, American Association of Nurse Anesthetists.

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Equipment

The first respirator to be described and probably the most useful one is the piston respirator, known as the Mörch respirator. This is an extremely simple and straightforward piston type which delivers an intermittent positive pressure respiration wherein the only variables are the respiratory rate and volume. As can be seen in the diagram, the apparatus consists of a constant speed driving motor connected to a variable speed gearbox. This connects to a crank which has a variable radius, which in turn connects to a reciprocating piston sliding in a cylindrical housing. The speed of the respirator can be varied by changing the relationships within the gearbox and the stroke of the piston or the volume put out by the respirator can be varied by changing the length of the crank arm. Air mixed with oxygen is drawn into the cylinder by the backward or suction stroke of the piston and then pushed out through a conveying tube up to the patient. Immediately proximal to the patient is a one way ball valve, referred to as a "click valve", which, during the positive phase of the respirator, allows the stream of air to be delivered into the trachea of the patient. During the filling or pulling-in phase of the respirator, the ball valve falls, to prevent air from being sucked from the patient back into the respirator and to provide for passive exhalation. (Fig. 1).

The volume capable of being put out by this respirator is from 0 to 3.5 liters. It is designed to function with a large leak around the tracheotomy or endotracheal tube. This leak forms a valuable safety valve,

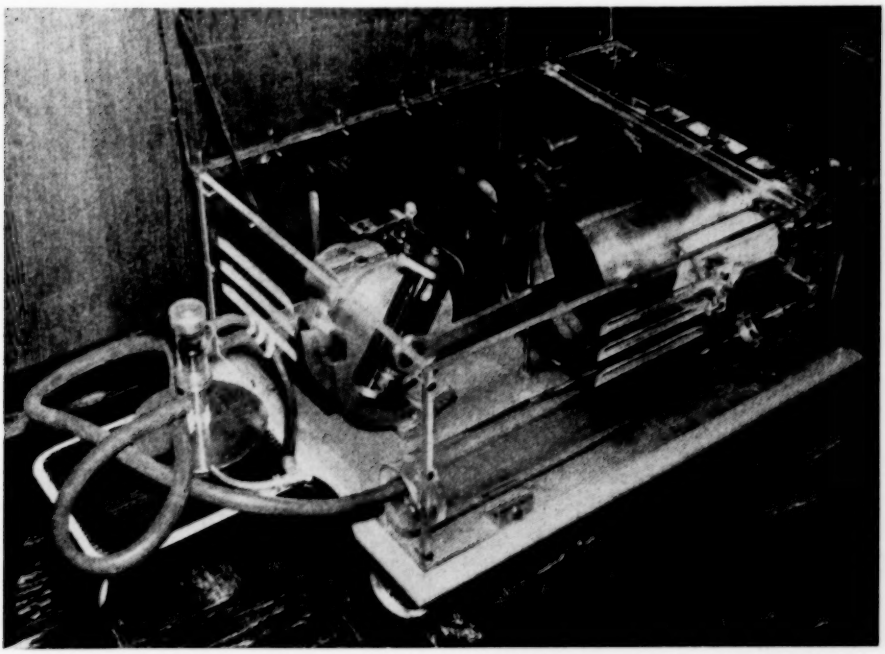

Fig. 1 — Mörch device connected to plastic click valve and tracheostomy tube.

making it practically impossible to blow too hard into the trachea and overdistend the lungs. At the same time it makes it possible for the patient who has a tracheotomy to talk and to make his wishes known. It can be used, however, with a tight-fitting tracheotomy tube, a factor which has been found to be extremely useful in the treatment of obstructive emphysema. In these instances it sometimes becomes necessary to markedly distend the respiratory tree and unusual pressures are required. To accomplish this, it is essential to have a tight-fitting tracheotomy tube, and this is usually accomplished by adapting a short endotracheal tube with a cuff.

A distinct disadvantage of the Mörch respirator is the difficulty of maintaining adequate humidity of the inspired atmosphere. There is a marked tendency for drying and crusting to occur. This leads to difficulty in removal of secretions, and thus to inadequate ventilation. This can be obviated to some extent by instilling 4 to 5 cc. of sterile, normal saline into the tracheotomy tube every 30 minutes. Another alternative is to place a continuous drip of physiological saline into the tube, being careful not to allow too much to go in, so that the amounts of sodium introduced are not in excess of physiological requirements. Humidification may also be introduced into the air stream. The most promising approach to this is being worked upon at the present time. A small Walton Humidifier is placed in a position just distal to the piston, and the air stream conducted through the water vapor. This appears to be a very promising method. A temporary measure is to place a T tube between the respirator and the click valve, close to the latter. The side arm receives a flow of highly humidified oxygen.

There are several respirators now in use in surgical suites which can be easily adapted for postoperative management of the patients needing respiratory aid. Surgical respirators can be used for postoperative use by simply keeping the anesthesia machine hooked up to the patient and utilizing the circle absorber with or without partial rebreathing. The use of a high concentration of oxygen, which would be inherent in this, is dangerous, and if one were forced to utilize such a method, it would be preferable to use compressed air instead of pure oxygen.

It should be kept in mind that all surgical respirators function by pushing the anesthetic atmosphere into the lungs of the patient, and then either suck it out or allow it to come out passively. The simplest approach to adapting a respirator to continuous use without an anesthetic machine is to enable the machine to pull in room air or oxygen for delivery to the patient through a non-rebreathing valve. This can be accomplished easily in the following manner. (Fig. 2.)

A T tube, of a diameter approximating that of the breathing tubes on an anesthetic machine, is used. In the tail of the "T" is inserted a rubber flap valve, such as those found in a Stephen-Slater non-rebreathing valve. These can be purchased from anesthesia apparatus companies at a nominal price or can be manufactured by oneself. This T valve is placed as close as possible to the respirator. During the filling phase of the respirator, air or oxygen is

drawn in through this valve. During the delivery phase, the valve closes and the contained gases are delivered to the patient. At the patient end of the delivery tube is a non-rebreathing valve which, during the filling phase of the respirator, closes the delivery port and opens the exhalation port. In the positive or delivery phase, the exhalation port is closed and the delivery port opened. A non-rebreathing valve such as the click valve on

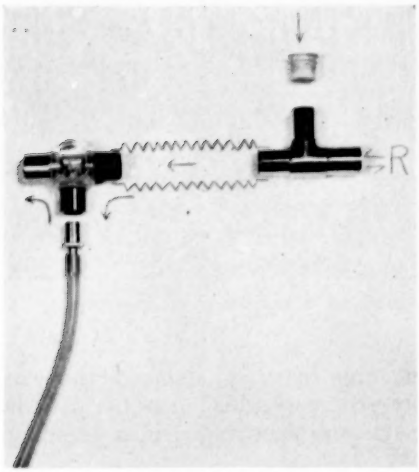

Fig. 2—Schematic of the Ruben non-rebreathing valve and "T" tube with rubber flap valve insert. "R" designates the respirator.

the Mörch respirator may be used for this. However, the Ruben valve, often found in anesthesia departments, serves the same purpose. This is an excellent non-rebreathing valve which functions smoothly to supply intermittent positive pressure and passive exhalation and can be used easily in conjunction with a respirator. The Fink valve, another non-rebreathing valve with an exhalation closure during the positive phase, can be used. For extended periods of time, however, this valve is not consistent enough in its action to be entirely satisfactory.

The Jefferson surgical respirator and the Bennett assister-controller may be adapted as shown. (Figs. 3 and 4). In the Stephenson respirator a T valve is built in. (Fig. 5). By removing a screw-down cover on the T arm, just below the upper bellows, air is drawn into the machine on the negative phase of the respirator, and then pushed out through the breathing tube, through the non-rebreathing valve and then into the patient.

All of this equipment can be fitted directly to an oral endotracheal tube, as well as to the tracheotomy tube. In comparison with the Morch piston respirator, an adapted surgical ventilator has a limited tidal volume, and therefore, is best used with a tight-fitting tracheotomy or endotracheal tube.

To add oxygen to the atmosphere being supplied to the patient, a breathing tube is placed over the input port on the T valve, and a small oxygen delivery tube is placed within the breathing tube with the outlet close to the input port of the T valve. The oxygen fills the open breathing tube during the positive phase of the respirator. On the negative phase, this high concentration of oxygen is drawn into the apparatus ready to be delivered to the patient on the next positive phase of the respirator. Humidity, as well as oxygen, may be introduced on the T valve arm.

Management of Patients on the Respirator

Best results are achieved for the patient requiring a respirator by putting him on controlled respiration. This is sometimes difficult and takes a good deal of persistent effort on the part of the operator to achieve it. If

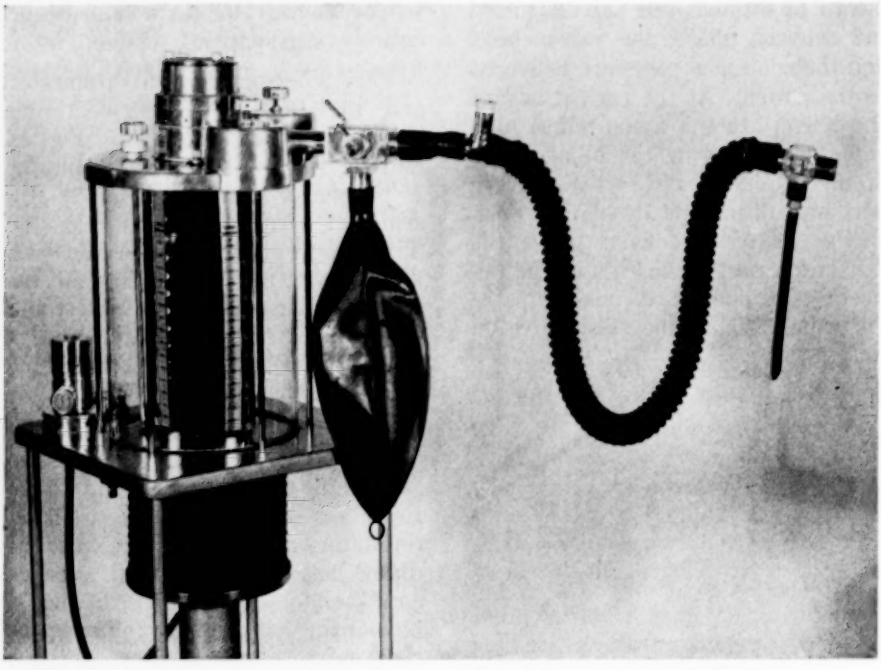

Fig. 3—Jefferson Surgical Respirator adapted as a non-surgical respirator.

the patient can tolerate a sedative, this is frequently helpful. However, this is not always possible. It is essential to gain the complete confidence of the patient, to have his understanding and his cooperation, to get the most efficient respirations. Occasionally the administration of small doses of succinylcholine may be beneficial. The respirator is usually adjusted for a rate which is close to, or a little faster than that of the patient, and it is then connected to the patient. Beginning with a low volume or pressure, the volumes or pressures are increased to a point where the patient appears to be getting adequate chest expansion. It must be kept in mind that intermittent positive pressure within the thorax in some patients markedly reduces cardiac output and a lowering of blood pressure results. In order to maintain as low a mean thoracic pressure as possible, once the patient is on controlled respirations, the high

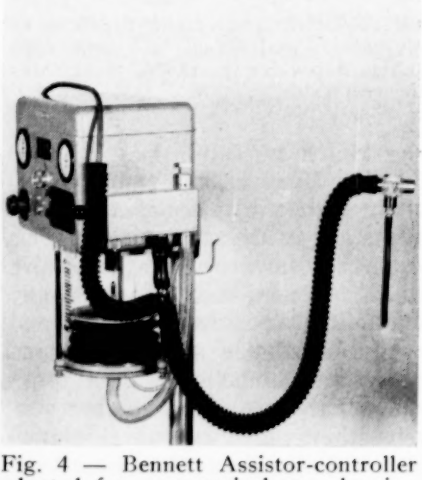

Fig. 4 — Bennett Assistor-controller adapted for non-surgical use showing oxygen being added through the tail of the "T" tube.

volumes and rates are adjusted downward, until the patient is just on control. This minimizes the circulatory effects of the respirator.

The normal physiological control is absent with the patient on controlled respirations. It is, therefore, essential that the carbon dioxide content and blood pH are followed closely for the first several hours. The respirator is adjusted to produce a very mild alkalosis. This will maintain the patient in a relaxed state, and at the same time minimize the possible effects of severe alkalosis. A pH range of 7.5 to 7.6 is desirable.

During the time that the patient is on the respirator, special nursing care is essential. All efforts must be directed toward minimizing the possibility of respiratory obstruction from secretions and the introduction of infection into the respiratory tree. This is achieved by frequent tracheobronchial toilet, which is done under as sterile conditions as possible. Our own technique is to have the operator wash his or her hands thoroughly before performing the tracheobronchial toilet. Each time the trachea is entered, a sterile suction catheter is used. When the catheter is rinsed, before being reintroduced, during the same episode, it is cleaned by sterile water each time. After each suctioning procedure, the cleaning water is discarded and fresh sterile water is made ready for the next procedure. The necessity of these precautions cannot be overemphasized.

The general state of the patient, especially regarding hydration in order to maintain the fluidity of the tracheobronchial secretions, is ex-

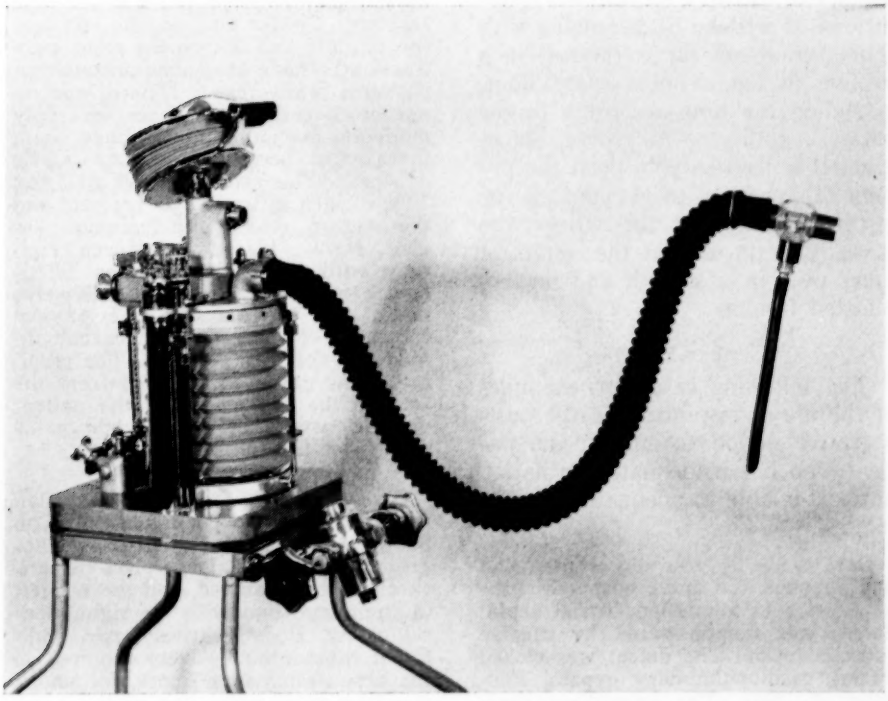

Fig. 5 — Stephenson Respirator adapted for non-surgical use.

tremely important. Some prefer to use adjuncts such as potassium iodide, and Triton expectorants to assist in liquifying the secretions. When using the Mörch respirator without a cuff, in the apprehensive patient who swallows frequently, a stomach tube sometimes has to be kept in place in order to relieve the gaseous distention which results from swallowed air.

The postoperative patient must be watched closely for objective signs of improvement, so that the weaning process can take place as soon as possible. Patients who are left on respirators for extended periods of time become psychologically dependent on them, and sometimes it is very difficult to wean them. The weaning process in the postoperative patient should be started as soon as he appears able to carry on his own respirations. It is done by beginning with short periods off the respirator, such as five to ten minutes every hour, extending the time according to the patient's ability to take over. Sometimes it is necessary to push the patient unseemingly to get him off the respirator. However, the patient who is ready to do without the respirator takes over in a smooth and uncomplicated fashion.

Case Reports

The following cases are examples of the use of respirators in the postoperative period to sustain the patient who has inadequate ventilation until he is able to adequately respire himself.

Case 1. A 34 year old woman had had dyspnea and ankle edema for one year prior to admission. Atrial septal defect was demonstrated by cardiac catheterization. The defect was closed during cardiopulmonary bypass, February 1, 1958. The immediate postoperative condition was satisfactory (systolic blood pressure 100 mg.Hg, arterial blood pH 7.44, blood volume 80 ml. per kilogram). Progressive hypotension and vasoconstriction developed in the next 18 hours with severe metabolic acidosis. Twelve grams of sodium bicarbonate were given intravenously for blood pH values as low as 7.15. An infusion of nor-epinephrine was used to maintain the systolic pressure at 90 mm. The patient became comatose and increasingly dyspneic without cyanosis. Chest x-ray showed no gross abnormality. She appeared in extremis 20 hours after operation. At this time a tracheotomy was done, and the respirator was connected when the arterial pH was 7.22. Her condition promptly improved, and the pH rose to 7.28 and then to 7.60 within twelve hours. The vasopressor drug was gradually stopped over the fourth and fifth postoperative days. Subsequent convalescence was uneventful.

Case 2. A 58 year old white man, tremendously obese, was admitted December 11, 1956, following a crushing chest injury received in an automobile accident. Twelve ribs on the left and the 1st, 8th, and 9th on the right were fractured. Moderate subcutaneous emphysema was present. There was no pneumothorax. While there was only moderate instability of the chest wall, the patient became increasingly dyspneic. The arterial blood pH was 7.15; oxygen saturation 77 per cent and the carbon dioxide 50 volumes per cent. He was placed on a Mörch respirator with a rapid improvement in his color and general condition. Twelve hours later the pH was 7.55, oxygen saturation 94 per cent and carbon dioxide 47 volumes per cent. The respirator was gradually stopped from the 14th to the 21st day, and the patient was discharged in good condition 30 days after the injury.

Case 3. A 54 year old colored man had a right radical pneumonectomy on September 3, 1958 for a large bronchogenic carcinoma. A large piece of pericardium was removed, and the sac left in communication with the right pleural cavity. Postoperatively, two additional thoracotomies were required in the first twenty-four hours, for shock resulting from herniation of the heart into the right pleural cavity. Hernia-

tion was precipitated by periods of dyspnea and restlessness during which time the patient would not remain as prescribed on his left side. After the heart had been replaced a third time, a tracheotomy was performed and the Mörch respirator employed. The respirator controlled the dyspnea and restlessness. It was possible to keep him comfortably on his left side for four days. The respirator was then stopped, and no further respiratory insufficiency occurred.

Case 4. A 44 year old white woman had severe respiratory insufficiency from a fibrothorax as a result of therapy for tuberculosis 13 years before. Dyspnea and moderate right heart failure totally incapacitated her. The vital capacity was 1400 ml., the arterial oxygen saturation 80 per cent and the pulmonary arterial pressure 90 mm.Hg A complete decortication of the lung was done March 15, 1957. Postoperative massive hemothorax caused increasing respiratory insufficiency over the next 48 hours. At this time she was in extremis but was resuscitated by tracheotomy, evacuation of the hemothorax and maintenance of adequate ventilation with a respirator. After 48 hours of being on the respirator, the arterial saturation was 85 per cent, the pCO_2 40 mm.Hg and the pH 7.28. Attempts to stop the respirator over subsequent days resulted in severe dyspnea and cyanosis with arterial oxygen saturations of 30 to 45 per cent. The respirator was required constantly for five weeks after which time it was gradually withdrawn until she was completely off it on the 41st postoperative day. She was discharged two and one-half months after operation with an oxygen saturation of only 75 per cent, pCO_2 35 mm.Hg, and a pH of 7.42. Her exercise tolerance steadily improved, and six months later she was able to walk 18 blocks with no dyspnea whatever.

Conclusion

The postoperative use of respirators foreshadows the bringing to surgery those patients who, under previous conditions, could not tolerate operation. The ability of the surgical team to sustain a patient during a period of respiratory inadequacy, interposed by the surgical and anesthetic procedures, makes this possible. The intelligent use of respirators on the part of the anesthetist is a real contribution to the advancement of surgery.

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Anesthesia in Severe Mediastinitis

J. Richard Amerson, M.D.*
Emory University, Georgia

Mediastinitis is an inflammation occurring within the middle space of the chest, limited by the *spine behind,* the *sternum in front,* and the *pleura on either side.*

The mediastinum is a potential space of loose areolar tissue and while it is divided into anterior, middle, posterior and inferior divisions, these are arbitrary and are not separated by well defined facial planes or other structures. Hence, there are no strict anatomical limitations of infection in the mediastinum. However, facial planes may direct infection from the neck to the anterior or the posterior mediastinum. The pretracheal space and the retro-visceral space are the major pathways for infection from the neck to the thorax and vice versa.

Mediastinitis is a serious lesion, carries a high mortality and requires emergency drainage if life is to be preserved. Large posterior mediastinal abscesses have been reported to contain as much as 2.5 liters of pus. Mediastinitis is most commonly an infection of the "posterior mediastinum" and is always secondary to some other condition. It may arise by one of four possible routes:

(1) Direct contamination from esophageal perforations
(2) Facial plane extension
(3) Direct spread from lung pleura or pericardium
(4) Spread by blood or lymphatic stream from a distant abscess.

Direct contamination is by far the most frequent cause, for over 50 per cent of cases of suppurative mediastinitis result from spontaneous *or* instrumental perforation of the esophagus, especially by an *esophagoscope* or *bougie*. Perforation most commonly occurs in the cricopharyngeal region. Less commonly it may arise from *foreign bodies, perforation of neoplastic or peptic ulcers, traumatic perforations from stab or gunshot wounds, spontaneous perforation or following breakdown of an anastomosis after esophageal surgery.*

Facial plane extension arises invariably from cervical infection. Retropharyngeal cellulitis will often spread down into the posterior mediastinum and further infiltrate around the aorta and lung roots.

Spread from lungs, pleura or pericardium may occur when a paramediastinal abscess or empyema penetrates into the mediastinum.

Lymphatic spread is rare. As pus increases in quantity, it extends from the posterior mediastinum into the middle and anterior mediastinum. It

* Associate in Surgery, Emory University, Georgia.

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may extend down into retroperitoneal areas or up into the neck, resulting in a phlegmonous or brawny induration.

The clinical features of the disease are essentially those of an untreated esophageal perforation. The patient complains of dysphagia and pain, especially pain in the neck or chest on swallowing. There are general signs of toxic infection. In the neck, there may be cervical induration, possibly surgical emphysema and suprasternal tenderness. The trachea is usually pushed well forward and occasionally deviated to one side.

Lateral cervical x-rays are invaluable in outlining an abscess and must be taken and interpreted promptly. Anterioposterior and lateral chest films may demonstrate emphysema. In the presence of air a fluid level is obvious. Anterior displacement of the esophagus is significant. Esophagrams may outline a perforation and the associated abscess cavity.

The treatment is *prompt* surgical drainage. The poorer the risk of the patient, the more one should lean to procedures that can be done under local anesthesia. Tracheo-mediastinotomy, tracheotomy and a cervical approach for drainage of the mediastinum can be done under local anesthesia. Esophagoscopy, in skilled hands, can be done safely under local anesthesia for removal of foreign bodies in adults.

If a general anesthetic with relaxants is to be used, one must be cognizant of the difficulties he may encounter and be well prepared to handle such.

Here the danger of air and fluid (pus) forced under tension beneath the facial planes which envelop the air passages and the great veins of the neck exist. If the tension is allowed to increase unrecognized, and untreated (say following laryngospasm after beginning induction) death will result from either airway obstruction or from venous tamponade or both. Another possibility is the progression of mediastinal emphysema to the extent where the mediastinal pleura will rupture, leading to a pneumothorax.

In the neck, the initial infection may cause laryngeal edema and/or abductor cord paralysis and thus set the stage for increased intratracheal pressure forcing the exhaled air out from the smallest perforation into surrounding tissues. As the tension increases, vessels draining the neck are further compressed, in turn, venous obstruction causes increased laryngeal edema and obstruction.

At this point, I would like to give you a brief case history to demonstrate the seriousness of this disease —particularly from the standpoint of the anesthetist.

A young male was admitted to a private hospital in this city with a complaint of having choked on a piece of pork. He was unable to swallow anything following this. Cervical films revealed the presence of anterior displacement of the trachea, and emphysema in the soft tissues of the neck. Examination revealed a brawny induration of the anterior and lateral areas of the neck. He was taken to the operating room for esophagoscopy and removal of the foreign body. With Pentothal® induction, and the use of relaxants, the patient's jaw became rigid—no airway could be insert-

ed. He developed laryngospasm, followed by cardiac arrest. A tracheotomy was performed and cardiac resuscitation begun. He responded to cardiac massage, but did not regain respiratory activity. He was maintained in a respirator for two days before he died with hyperthermia and irreversible cerebral damage. The esophagus was never endoscoped.

In summary, the patient with mediastinitis constitutes a very serious surgical problem. The complications of airway obstruction and venous tamponade may rapidly lead to death. The type of anesthesia to be used should be the one with least hazard to the patient. Equipment for establishing an airway—tracheotomy—should be readily available before a general anesthetic is begun.

In the poor risk patient with this surgical disease, the use of local anesthesia, both for endoscopy and mediastinotomy may well be the anesthesia of choice.

Anesthesia and Surgery for the Elderly Patient

Robert P. McBurney, M.D.*
Saint Elmo Newton, III, M.D.*
Memphis, Tennessee

"Cast me not off in the time of old age;
When my strength faileth, forsake me not." — Psalms

The ever increasing proportion of our older population poses many problems for those of us who care for the health and well being of the aged. Such problems are met and dealt with daily.

In 1900, one person in twenty-five was over 65 years of age; in 1955, one person in twelve, and it is estimated that by 1975, one person in every seven will be more than 65 years of age. As researchers continue to probe into metabolic processes such as lipid metabolism and arteriosclerosis, it is only reasonable to expect man's life span will be further prolonged.

In surgical practice, one encounters a great increase in the number of aged persons undergoing major surgery. Diseases such as appendicitis, abscesses, and peritonitis have become less common; whereas, cancer, ruptures, vascular diseases, and diseases of the elderly have become more prevalent, and most of the major surgery now is done for such diseases.

In the years from 1954 through 1958, the Sanders Clinic surgeons operated on more than 500 patients who had passed the age of 65. Three hundred forty-two of these patients were past the age of 70, and we have analyzed their case records in an effort to learn from our experience how we may better cope with the problem of surgery in the aged. This group of patients had all had general anesthesia plus major or minor surgery. One hundred and thirty-nine of these patients were men, and two hundred and three were women.

Analysis of Cases

In the years 1954 through 1958, there were 364 operations on individuals past the age of 70. Three hundred of these operations were major in nature and 64 were minor. Three hundred and three procedures were done on individuals in the age group of 70 to 80; 58 were on individuals aged 80 to 90, and 2 individuals past the age of 90 were operated upon.

The anesthetics used in this group of cases were as noted in Table I.

A variety of surgical procedures were done on these 342 patients. The 64 minor procedures included esophagoscopy, abscess drainage, removal of benign tumors of skin or subcutaneous tumors, hemorrhoidectomy, and the like.

* Surgical Staff, Sanders Clinic, Memphis, Tennessee.
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Table I
Anesthesia in the Aged

Agents	Procedures
Pentothal, Cyclopropane and muscle relaxants	208
Pentothal, Ether, and Nitrous Oxide	80
Pentothal, Nitrous Oxide, Cyclopropane, and Ether	20
Pentothal and Nitrous Oxide	24
Miscellaneous	32

The 300 major cases are summarized in Table II.

Table II
Major Surgical Procedures in the Aged

Procedure	Number of Operations
Colectomy	48
Cholecystectomy	43
Hernia repair	40
Gastrectomy	26
Other stomach operations	24
Colostomy	22
Hysterectomy	18
Appendectomy	25
Laparotomy with biopsy	16
Radical mastectomy	11
Choledochojejunostomy or duodenostomy	11
Miscellaneous	16
TOTAL	300

Many of the patients who were operated on were poor risks, and nearly every patient past the age of 70 had at least one disease in addition to that for which surgery was done.

Table III is a list of the more common accompanying diseases found to be present in the patients operated on.

The complication rate in the aged patient was higher than would be present in an overall surgical population. Thirty-six complications developed in our three hundred major cases. They are listed in Table IV.

Of the total group of 364 operations performed on 342 patients, eighteen patients died following surgical procedures. This represents a surgical mortality rate of five per cent. If one eliminates from this

Table III
Incidence of Systemic Diseases Present in Surgical Patients Past Seventy

Disease	Number of Patients
Heart Disease (Includes previous infarction, irregularities of rhythm, enlarged heart, evidence of failure, etc.)	106
Hypertension	88
Emphysema or other lung disease	27
Diverticulitis or diverticulosis	43
Prior "stroke"	14
Diabetes	16
Arthritis	20
Renal disease	20
Miscellaneous	110

Table IV
Postoperative Complications in the Aged

Complication	Number of Times Present
Cystitis	5
Coronary occlusion with infarction	4
Renal failure	4
Wound infection	3
Wound disruption	3
Pneumonia	3
Shock	3
Peritonitis	2
Pulmonary embolism	2
Miscellaneous	7
TOTAL	36

group three patients who died postoperatively in whom extensive carcinoma was present, then the corrected mortality rate is four per cent. This figure is still more than twice the mortality rate for an overall surgical population.

The primary cause of death in these patients is listed in Table V.

Table V
Cause of Postoperative Death in Aged

Cause of Death	Number of Patients
Renal failure	4
Coronary occlusion	3
Pneumonia	2
Cerebrovascular accident	2
Pulmonary embolism	1
Mesenteric thrombosis	1
Cardiac failure	1
Peritonitis	1
Carcinomatosis	3
TOTAL	18

Discussion

Despite abundant evidence to the contrary, there is still a widespread notion among physicians and laity that aged persons cannot survive major surgery. It is true that the incidence of complications and the mortality rates in the aged are higher; however, neither of these rates are excessive and are now comparable to the morbidity and mortality rates of the younger group ten or fifteen years ago.

The main problems one has to deal with in the elderly are malnutrition, vitamin deficiency, and low metabolic activity. The main systemic diseases that increase the patient's risk are cardiovascular disorders including hypertension, emphysema, chronic bronchitis and renal disease. Worry, fear, and a lack of desire to get well are features to contend with in many elderly patients, and these may become serious problems.

Preoperative Evaluation and Treatment

In addition to the routine examinations, there are many other things that can and should be done for the elderly patient to insure a successful operative result.

Each elderly person should have a preoperative electrocardiogram and a

careful cardiac evaluation. Many individuals may have heart disease without a prior history of trouble and without ausculatory findings. If a patient has had a recent coronary thrombosis, it is wise to delay surgical operation for a few months, if possible, to allow for maximum healing of the infarct and decrease in cardiac irritability. A patient with a history of cardiac failure or arrhythmias should be carefully evaluated and adequately treated prior to any surgical procedure. It is, in my opinion, unwise to attempt to reduce hypertension too drastically before surgical operation because individuals who are dosed with antihypertensive drugs will have even further fall in blood pressure when anesthesia is induced. Many patients with arteriosclerosis need a fairly high pressure to maintain adequate blood flow. Individuals with extremely high pressures should be hospitalized at rest and sedated prior to surgery. Occasionally pressures go extremely high during anesthesia, and cerebral hemorrhage may result when such occurs. In our series, heart disease and hypertension were the two most common diseases present in aged surgical patients. A third of the complications and more than one-half of the deaths could be ascribed to cardiac or vascular disease.

For patients with emphysema, chronic cough, bronchiectasis, or chronic bronchitis, it is best to institute a bronchial "clean up" program several days before surgery. This consists of abstinence from smoking, antibiotic therapy, aerosol therapy with antibiotics and mucolytic agents, and in some cases, therapy with intermittent positive pressure breathing. This ounce of prevention will go a long way toward preventing atelectasis, pneumonia, disruption of wounds due to coughing, and anoxia with its complications. These were significant complications in our group of cases. (Table IV.)

Elderly men are prone to have chronic urethral obstruction due to prostatic hypertrophy. This condition should be carefully evaluated prior to surgery, and in many instances, it is wise for the patient to have a transurethral prostatic resection before he has another procedure of an elective nature. Examination of the kidney function and blood electrolytes in the aged should always be done before major surgery is performed.

Of course, diseases such as diabetes and infections should be controlled before elective surgery, and blood volume and nutrition should be restored insofar as possible.

Preoperative medication for the aged should be reduced from the dosage prescribed for younger adults. Long acting barbiturates should be avoided since the metabolic rate and activity is low in the aged, and their enzyme systems that detoxify drugs are not as active as in the young.

Another preoperative consideration is to the mental attitude of the patient. Many elderly persons fear that because of their advanced age they will not survive surgery. They need assurance from the surgeon and confidence in him and in the anesthetist.

Choice of Anesthetic

For the elderly, one should use agents that are metabolized rapidly and do not lead to postoperative depression. Nitrous oxide and oxygen may be satisfactory when muscle relaxation is not needed. Some danger of anoxia is always present, however,

if excessive concentrations of nitrous oxide are used.

We, personally, prefer cyclopropane as the primary agent for both elderly and young patients as it is rapidly eliminated and most patients are awake or nearly so when they leave the operating room. High concentrations of oxygen can also be used with this agent. We have not observed any cardiac difficulties when this agent is used, particularly if it is combined with small doses of muscle relaxants when the abdomen is to be closed.

Although ether is an agent with a wide margin of safety, it is more apt to produce prolonged sleep and somnolence, and we feel that the incidence of postoperative respiratory complications is greater with ether than with cyclopropane.

Small doses of Pentothal® are excellent for induction of anesthesia; in fact, they are almost indispensable, but it is not possible to do major procedures safely with Pentothal® only. Most of the cases in our series in which Pentothal® alone was used were minor cases of only a few minutes duration.

The use of muscle relaxants must be carefully administered; long acting relaxants should be avoided, and in the aged, multiple small doses are better than one large one. We have seen several patients who required artificial ventilation for one-half to one hour after surgery was completed when the anesthetist gave a large dose of relaxant as the surgeon began to close the abdomen. Older patients do not need large doses of any agent.

Since this paper deals with the risk of surgery and general anesthesia only, spinal anesthesia and related agents will not be discussed. With any agent certain principles are paramount in importance: — 1. Anoxia must be absolutely avoided. 2. Fluctuations in blood pressure must not be allowed. 3. Shock should be prevented by adequate, early blood replacement.

The Operation

Surgery in the elderly should be gentle, and blood loss should be avoided. Much has been written about the modern techniques and that with their employment the surgeon need not hurry. This is untrue in the aged as speed and dispatch are important. No surgery should take more than two hours or postoperative troubles will increase. This is not to advocate reckless speed, but is a stand for "no piddling."

Only necessary procedures should be done. Cosmetic surgery is of no importance to the patient past seventy.

Special care must be taken to prevent infection, as the addition of infection to trauma is a serious complication in the elderly.

Postoperative Considerations

Prevention of complications is much more important in the elderly than in any other age group. Close attention is essential postoperatively to avoid respiratory depression, to maintain blood pressure and a clear airway, and to encourage early motion and activity. If complications occur, one may see the patient fall apart all at once like the "wonderful one-hoss shay" of Oliver Wendell Holmes.

"It went to pieces all at once
All at once and nothing first.
Just as bubbles do when they burst."

SUMMARY

1. A large proportion of surgery is now being done on elderly patients. This number will increase in the future.

2. Three hundred and sixty-four operations on patients 70 years or older were done under general anesthesia by the Sanders Clinic surgeons during the years from 1954 through 1958.

3. Three hundred of these operations were major procedures, the most common being colon resection, cholecystectomy, hernia repair, gastrectomy, and other gastrointestinal procedures. This series also included chest surgery, blood vessel grafts, resection of the pancreas, and other procedures of magnitude.

4. Nearly every patient past 70 had other diseases of a systemic nature in addition to the disease for which surgery was being done. Heart disease, hypertension, emphysema, diverticulosis, renal disease, and arteriosclerosis were the most frequently encountered diseases.

5. Complications occurred in about 10% of persons operated on, and these were either due to vascular or heart disease or to pneumonia, renal failure, shock or infection. Several complications often occurred at the same time in the same patient.

6. The mortality rate due to surgery was 4%. The over-all postoperative mortality was 5%. Causes of death were renal failure, coronary occlusion, pneumonia, cerebrovascular accidents, pulmonary embolism, mesenteric thrombosis, cardiac failure and peritonitis in that order of frequency.

7. A large variety of anesthetics were used in this group of 364 cases. The most popular one was cyclopropane, Pentothal® and muscular relaxants. There were no deaths on the operating table, and in only one case was it thought that anesthesia led to the patient's death. In that individual vomiting and aspiration at the termination of anesthesia led to pneumonia and death.

8. In spite of traditional opinion to the contrary, it has been well established that the aged patient stands surgery well, and if the necessary precautions and care are given to each patient, then he has a 95% chance of surviving surgery of major proportions.

Now, with apologies to the good Dr. Oliver Wendell Holmes, we close with this thought.

"Little of all we value here
Wakes on the morn of its seventieth year

Without both feeling and looking queer

In fact, there's nothing that keeps its youth

So far as I know, but a tree and truth."

"But though we may look and feel quite queer

When we all reach that seventieth year,

With the right kind of care and the will to survive

We are bound to at least hit eighty and five."

Obstructive Pulmonary Emphysema

Jack Cleverdon, C.R.N.A.*

Wichita, Kansas

There seems to be an ever increasing number of patients being submitted for anesthesia and surgery with chronic pulmonary disease. It is hoped that these notes will stimulate interest in chronic pulmonary emphysema so that individuals who are called upon to administer anesthesia for patients with this disease will use as many therapeutic measures as possible in preoperative preparation. It should be remembered that the same factors responsible for poor pulmonary ventilation in this disease are responsible for prolonged inductions and increased recovery times from inhalation anesthetics. Anesthesia techniques and drugs that have a tendency to produce bronchospasm, secretions, hypoxia or carbon dioxide retention should be used with extreme caution. Supportive therapy in the recovery and postoperative periods should include inhalation therapy procedures.

This discussion will be limited to obstructive pulmonary emphysema: what it is, how it is brought about, and what can be done about it, with special emphasis on treatment utilizing the respiratory passages as routes of administration.

* Department of Anesthesiology, Division of Inhalation Therapy, Wesley Hospital.

Obstructive pulmonary emphysema is a chronic disease of the lungs in which there is loss of elasticity with breakdown of the alveoli, producing large, dilated air sacs. This reduces the ratio of alveolar surface to the intrapulmonary space, resulting in poor pulmonary ventilation and hypoxia with carbon dioxide retention.

This pathology is brought about by chronic obstruction of the air passages at the level of the bronchioles by conditions such as asthma (allergic or psychogenic) and edema as a result of inflammation (chemical irritation or infection) being associated with thick secretion, poor ciliary activity and ineffective bronchiole peristalsis.

It should be remembered that during normal inspiration the bronchioles increase their longitudinal and transverse diameters and that during expiration contract in both these diameters. It is easy to see, then, why bronchiole obstruction is greater during the exhalation phase of the ventilation cycle with the resultant increase in exhalation time and trapping of air in the lung, keeping the tissue on stretch and in time destroying the natural recoil of the lung along with alveolar breakdown. Also, because of this pathology, individuals with this disease who enter the hos-

pital are often severely incapacitated and poorly nourished. They are apprehensive and have a feeling of impending doom. They have obvious respiratory distress with the chest in full expansion, use their accessory muscles of respiration, paradoxically using the diaphragm during expiration rather than for inspiration. Orthopnea exists, the patients being unwilling or unable to lie down, exhaling through pursed lips, perhaps cyanotic, and mentally confused from hypoxia and carbon dioxide poisoning.

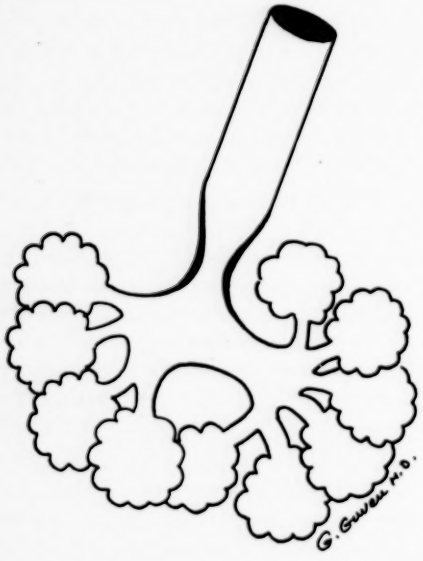

Diagram I. Represents the normal functional unit of the lung with its terminal bronchioles, respiratory bronchioles, atria, alveolar ducts, air sacs and pulmonary alveoli.

The aim in treating patients with this disease is to restore pulmonary function to as near normal as possible. With the express desire to reduce incapacitation perhaps to the point of gainful employment, reduce discomfort, prolong life and prevent further tissue damage, a complete diagnosis should be made and all coexisting diseases as well as the emphysema should be properly treated.

The treatment of these patients should be undertaken with the attitude that something can be done for them. True as it is that elastic tissue cannot be made to return or alveoli to come back where they once were, it is, however, important to understand that many have some normal, or near normal, lung tissue to live with which may benefit from treatment.

Particular attention should be directed toward hydration and nutrition, resorting to tube feeding and parenteral therapy if necessary. It has been said that good hydration is the first and best defense against obstructive pulmonary secretions. Physiotherapy should be used to restore muscle tone and re-educate the respiratory muscles to bring about more effective pulmonary ventilation. The allergic and psychogenic factors must be included in the overall consideration of the patient. If they should be present, there must be diagnosis, then proper treatment — perhaps desensitivation procedures or psychotherapy if necessary.

Systemic medication, as bronchial dilators, vasoconstrictors, expectorants, antibiotics, steroids and the guarded use of tissue depressants, such as narcotics and barbiturates, should be used to their fullest advantage.

Bronchoscopy should be used for the removal of secretions from the larger bronchi and trachea rather than tracheostomy. The latter eliminates the ability to cough and the use of the lips to apply resistance to expiration. In passing, this applies to infants with a grunting type of respi-

ration. If tracheostomy must be done, the Trendelenburg position and a mechanical device to bring about resistance to exhalation may help overcome some of its disadvantages.

Pulmonary function tests, especially the timed vital capacity, and chest x-ray should be carried out as early as possible so therapeutic response may be better evaluated.

The use of inhalation therapy, aerosolized medicinals, gases and the application of pressure gradients to the pulmonary tree make it possible to quickly and directly attack mucus, infection, edema and bronchospasm in an effort to relieve bronchial obstruction to ventilation.

The use of gases in the treatment of this disease is extremely important because this includes oxygen for the serious condition of hypoxia. Individuals with this disease carry a high carbon dioxide and a low oxygen content in the blood. In this situation the carotid and aortic bodies respond

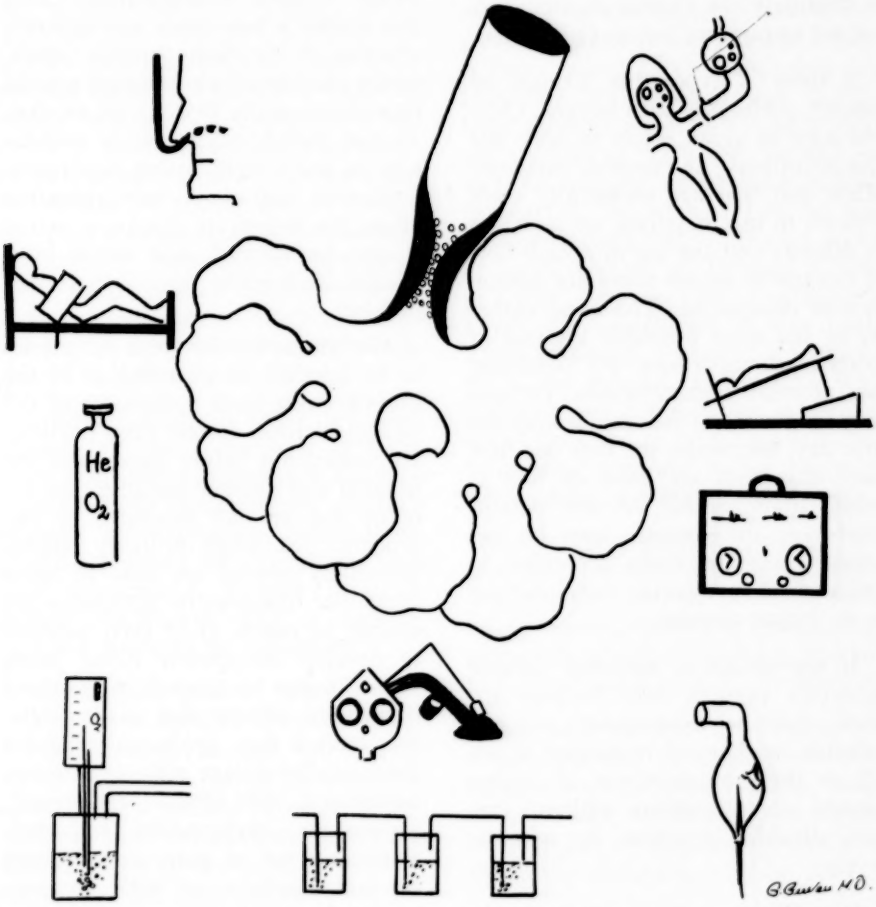

Diagram II. Represents the emphysematous pathological functional unit of the lungs and diagrammatic suggestion of therapy.

to oxygen lack and stimulate the respiratory center to bring about respiration, rather than the normal stimulation of carbon dioxide directly on the respiratory center, which is the case in healthy persons.

Oxygen administered in high concentration may produce apnoea, for the carotid and aortic bodies are no longer stimulated by hypoxemia. The apnoea produced may result in such high carbon dioxide retention that no degree of hypoxemic stimulation from the carotid and aortic bodies is able to stimulate the carbon dioxide narcotized respiratory center to function.

If there is hypoxemia it must be treated, preferably with oxygen. Oxygen may be given safely in very low concentrations by several methods. Mask and tent are technically more difficult to use, requiring air injectors or dilutors and the use of a high flow of oxygen to assure adequate carbon dioxide dissipation. The nasal catheter is the most desirable method of oxygen administration for obtaining low alveolar concentrations. Oxygen may be given one liter per minute the first day, increasing the flow one liter each day until six liters of flow is being administered. As the patient improves, the oxygen may be decreased one liter daily according to the patient's response until oxygen is no longer necessary.

If the situation warrants (severe hypoxia) persons who become apnoeic may be resuscitated, using a suitable mechanical respirator which allows the administration of higher oxygen concentrations without carbon dioxide retention to narcotic levels.

We should remember that oxygen administered so that there is an extremely high alveolar oxygen concentration may produce acidosis by keeping the hemoglobin almost completely saturated with oxygen. Oxyhemoglobin is more acid than reduced hemoglobin and also is unable to do its share in carrying carbon dioxide to the lung, further contributing to acidosis. The acidosis irritates lung tissue, producing inflammation which results in an alveolar type hypoxia.

Helium is a satisfactory inert gas that may be used to dilute oxygen in an effort to prevent too high alveolar oxygen concentration. This also makes a less dense gas mixture, allowing it to flow through small, partly obstructed air passages several times more easily than air or oxygen. To use helium-oxygen it is mandatory to use a tight fitting face mask. Catheters and tent administration allow the helium to dissipate before it can be inhaled and result in a wholly inadequate approach to the problem.

Medicines, in the form of a mist to be inhaled, to be effective in the bronchi must have a diameter of 0.3 to 2.0 microns. Larger mist particles are baffled out before they reach the bronchi and smaller particles are exhaled and are not deposited on the bronchi. Antibiotics properly administered by aerosol are able to reach areas that blood-borne antibiotics are unable to reach. It is even possible to develop therapeutic blood levels of antibiotics by aerosol. Aerosolized bronchiole dilators and vasoconstrictors have a fast, prolonged response from smaller dosage without as many undesirable side effects—excitement, restlessness, tachycardia, hypertension—and not as early development of tachyphylaxis as with systemic medication. This allows safer, more comfortable and prolonged therapy.

Respiratory secretions in the bronchi may be effectively treated by the inhalation of aerosolized mucolytic substances that help liquefy and loosen them from their bronchiole attachment by increasing their bulk so ciliary activity, peristaltic action and coughing will be more effective in removing them.

Some of the drugs given by nebulizers produce irritation to the mouth and throat. A few sips of water and a mouth wash immediately after treatment will help guard against this.

The patient receiving mucolytic aerosols should be observed continuously, because as the secretions increase in bulk there is the possibility of increasing respiratory obstruction. He should be encouraged to cough and placed in the head down position to facilitate drainage. If necessary, other steps such as a bronchoscopy or the use of a cough machine to assist in the removal of the secretions should be carried out.

Pressure gradients that may be applied to the pulmonary tree to treat obstructive pulmonary emphysema include intermittent positive pressure on inspiration, intermittent positive pressure on expiration, and slow intermittent positive pressure during inspiration with a sudden negative pressure on expiration.

Intermittent positive pressure on inspiration is brought about by using a mechanical device that will deliver air or gases into the intrapulmonary space until a specific pressure is developed, then automatically bringing about release of the pressure, allowing it to fall back to atmospheric. Intermittent positive pressure breathing on inspiration ventilates portions of the lungs the patient was unable to aerate by assisting in pushing air past obstructions so coughing will be more effective. It also aids in depositing aerosolized medicine into the areas that otherwise would have missed therapy. This equipment may be used for resuscitation, breathing exercises, and as an aid when attempting to re-educate the proper and more effective use of the respiratory muscles.

Intermittent positive pressure breathing on expiration is brought about by producing resistance to expiration. Many people learn to create positive pressure on exhalation by breathing out through lips tightly held together. For individuals who are unable, or have not learned, it may be brought about mechanically by having the patient breathe out through a small tube, through a series of water bottles, or through a hole in a disk. Pressure against exhalation forces the bronchioles to stay open longer, allowing a greater amount of air to be exhaled, and in this way provides better ventilation. This also may be utilized in breathing exercises to increase tone and better usage of the muscles of respiration.

Intermittent positive pressure inspiration, quickly followed by negative pressure, may be produced by a cough machine which is designed to artificially simulate coughing and aid in forcing material from the airways.

To assist the expiratory phase of respiration and to elevate the diaphragm so inspiration can be more effective the Pneumo-belt, a device that applies intermittent pressure to the upper abdomen, may be used.

Orders that might conceivably be used for hospital treatment of a pa-

tient with obstructive pulmonary emphysema are:

1. Suitable diet and fluids
2. Laboratory procedures (including timed vital capacity)
3. X-rays (chest)
4. Suitable antibiotics
5. Suitable expectorants (iodides)
6. Suitable bronchial dilators
7. Suitable steroid therapy
8. No sedatives or narcotics
9. Medication for any coexisting diseases
10. Always explain each procedure before equipment is brought into the patient's presence
11. Oxygen, one liter per minute, by nasal catheter. Use Turgimist by aerosol generator for humidification. Observe continuously for ten minutes for increased respiratory obstruction (dyspnea), hypoventilation or apnoea, mental confusion. Have Bennett machine with cycling device for resuscitation and coughalator immediately available (may consider bronchoscopy).
12. Intermittent positive pressure breathing inspiration with Bennett machine stat and three times daily: 9 a.m., 1 p.m. and 9 p.m. Ten cm water pressure for 20 minutes, using helium 75 per cent and oxygen 25 per cent. Manually express chest and upper abdomen to assure against air trapping.
13. Isuprel 1:200 0.2 cc
    Penicillin 5,000 units to cc 0.5 cc
    Turgimist 1.0 cc
    Neo-Synephrine 1 per cent 0.3 cc
    Nebulize with intermittent positive pressure treatment. After treatment have patient rinse mouth and take a few swallows of water.
14. Place patient 25 degrees head down. Use coughalator for four series of five cycles each, allowing one minute's rest between series, with 30 plus on inspiration for 2.5 seconds and 40 minus on exhalation for 1.5 seconds. Manually express chest and diaphragm after each treatment.
15. Allow patient to use Fowler's position and pillows for comfort and use bed rails if necessary.
16. Use Pneumo-belt 16 cycles per minute, except when cough machine is being used.
17. Increase nasal oxygen by one liter for six days (six liters flow).
18. Physiotherapy for strengthening the diaphragm and re-education of respiratory muscles, utilizing head down position. Intermittent positive pressure breathing on inspiration and intermittent positive pressure on expiration (bottles).
19. Teach use of hand nebulizer (DeVilbiss #40)
20. Psychiatric consultation
21. Allergist consultation
22. Physical medicine consultation
23. Stop treatment as soon as possible, according to the patient's progress. Recheck chest x-ray and timed vital capacity.

Nominations for Office American Association of Nurse Anesthetists

1959-1960

PRESIDENT

Olive L. Berger (Johns Hopkins Hospital, Baltimore): Graduate of Roosevelt Hospital School of Nursing, New York City; graduate of the Johns Hopkins Hospital School of Anesthesia, Baltimore; member of A.A.N.A. in good standing since 1933; former president, Maryland Association of Nurse Anesthetists; former 2nd vice president, A.A.N.A.; former member, Educational and Nominating Committees, A.A.N.A.; member Board of Trustees, A.A.N.A., 1952-54; 2nd vice president, A.A.N.A., 1954-56; 1st vice president, A.A.N.A., 1956-58. President, A.A.N.A., 1959.

PRESIDENT-ELECT

Evelyn E. Auld (Watts Hospital, Durham, N. C.): Graduate of Johns Hopkins Hospital School of Nursing, Baltimore; graduate of the Duke University Hospital School of Anesthesia, Durham, N. C.; member of A.A.N.A. in good standing since 1942; Chief Anesthetist and Director of the School of Anesthesia at Watts Hospital 1948-59; member of Examination, Education and Advisory to Approval of Schools Committees, A.A.N.A.; member, Board of Trustees, A.A.N.A., 1954-56; 2nd vice president, A.A.N.A., 1956-58. First vice-president, A.A.N.A., 1959.

VICE PRESIDENT

Jessie L. Compton (Methodist Hospital, Dallas, Texas): Graduate of Parkland Hospital School of Nursing, Dallas; graduate of the Baylor University Hospital School of Anesthesia, Dallas; member of A.A.N.A. in good standing since 1940; Chief Nurse Anesthetist, Methodist Hospital, Dallas, 1939-59; member and chairman of many A.A.N.A. Committees, 1944-58; member, Board of Trustees, A.A.N.A., 1951-53. 2nd vice-president, A.A.N.A., 1958-59.

TREASURER

Helen L. Caskey (Columbia, South Carolina): Graduate of South Carolina Baptist Hospital School of Nursing, Columbia; graduate of Baylor University School of Anesthesia, Dallas, Texas; member of A.A.N.A. in good standing since 1948; Treasurer, South Carolina Association, 1954-56; President, South Carolina Association, 1956-58; Chairman, Exhibits Committee, Carolinas-Virginias Assembly, 1958, and has served as chairman or member of other state and assembly committees since 1953.

Marie W. McLaughlin (Ingalls Memorial Hospital, Harvey, Ill.): Graduate of St. Luke's Hospital Nurse's Training School, St. Paul, Minn.; graduate of St. Luke's Hospital School of Anesthesia, St. Paul; member of the A.A.N.A. in good standing since 1933; secretary-treasurer, Tri-State Nurse Anesthetists Assembly, 1953-54; chairman of Convention Committee, A.A.N.A., 1953-54; member of Bylaws Committee, A.A.N.A., 1954-55; Treasurer, A.A.N.A., 1955-59.

TRUSTEES REGION I

Bernice V. Pierce (Veterans Administration Hospital, Washington, D. C.): Graduate of Washington County Hospital School of Nursing, Hagerstown, Md.; graduate of Charity Hospital School of Anesthesia, New Orleans, La.; member of A.A.N.A. in good standing since 1944; organizational chairman and first president, District of Columbia Association of Nurse Anesthetists, 1956-57; Chairman, A.A.N.A. Approval of Minutes Committee 1958; Vice-President, D. C., 1959.

Kathleen C. Hogan (Garden City, New York): Graduate of Lenox Hill Hospital School of Nursing, New York City; graduate of St. Francis Hospital School of Anesthesia, Peoria, Ill.; member of A.A.N.A. in good standing since 1951; Secretary, N. Y. Association, 1952-54; Treasurer, N. Y. Association, 1954-56; Vice-President, N. Y. Association, 1956-58; President, N. Y. Association, 1958-59; Member, A.A.N.A. Convention Committee, 1957; Chairman, A.A.N.A. Convention Committee, 1959.

Alma Prykanowski (Trenton, N. J.): Graduate of Mercy Hospital School of Anesthesia, Pittsburgh, Pa.; graduate of St. Francis Hospital School of Nursing, Trenton, N. J.; member of A.A.N.A. in good standing since 1939; president, New Jersey Association, 1951-54; Chairman, Middle Atlantic Assembly, 1957-59; Member of A.A.N.A. Approval of Schools Committee, 1953-54, and Chairman, 1954-56; Member, A.A.N.A. Nominating Committee, 1957-58.

TRUSTEES REGION 4

Joseph P. McCullough (Cedar Falls, Iowa): Graduate of Alexian Brothers School of Nursing, Chicago; graduate of Norwegian American Hospital School of Anesthesia, Chicago; member of A.A.N.A. in good standing since 1949; Treasurer, Iowa Association, 1951-55; President, Iowa Association, 1957-59; Secretary, Upper Mid-West Assembly, 1955-56; Chairman, Upper Mid-West Assembly, 1956-57; Member, A.A.N.A. Approval of Schools Committee, 1956-59.

Jeanne Anderson (Oklahoma City, Okla.): Graduate of Baylor Hospital School of Nursing, Dallas, Texas; and Baylor Hospital School of Anesthesia, Dallas; member of A.A.N.A. in good standing since 1953; Secretary-Treasurer, Oklahoma Association, 1955-57; Vice-President, Oklahoma Association, 1958; President-Elect, Oklahoma Association, 1959.

Florence E. Ballenger (Billings, Mont.): Graduate of Pasadena Hospital School of Nursing, Pasadena, Calif.; graduate of Columbus Hospital School of Anesthesia, Great Falls, Mont.; member of A.A.N.A. in good standing since 1944; Vice-President, Montana Association, 1954; Secretary-Treasurer, Montana Association, 1958-59; Member of Montana State Bylaws Committee, 1958.

TRUSTEES REGION 5

Olivia Brye (Portland, Oregon): Graduate of Deaconess Hospital School of Nursing, Grand Forks, N. Dak.; graduate of Lakeside School of Anesthesia, Cleveland, Ohio; member of A.A.N.A. in good standing since 1934; Former President of Oregon Association; former Vice-Chairman, Western States Section; former Editor of *OANAGRAM;* has served on the Approval of Schools Committee of A.A.N.A.

Mary Fleming (Seattle, Wash.): Graduate of General Hospital School of Nursing, Edmonton, Canada; graduate of Bushnell General Army Hospital School of Anesthesia, Utah; member of A.A.N.A. in good standing since 1947; Secretary-Treasurer, Western States Section, 1949-50; Vice-Chairman, Western States Section, 1951-52; Secretary, Washington Association, 1950-51; President, Washington Association, 1954-55; Chairman, A.A.N.A. Loan Fund Committee, 1956-58, and has served on several other state and regional committees.

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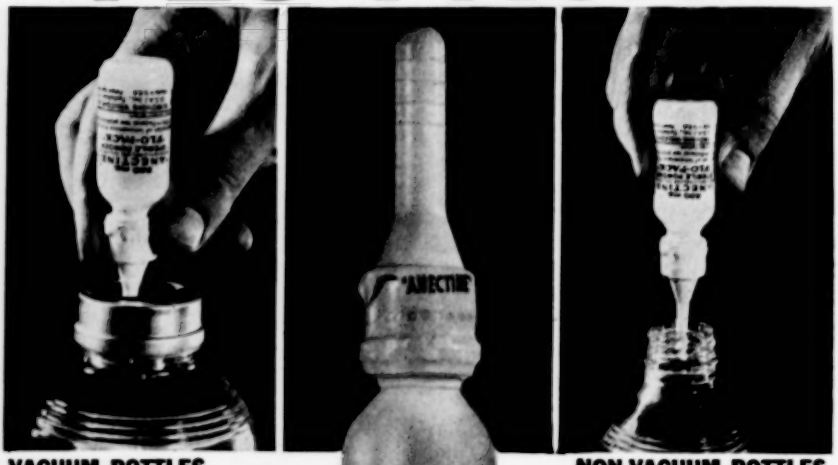

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Book Reviews

Introduction to Human Anatomy. By Carl C. Francis, A.B., M.D., Associate Professor of Anatomy, Department of Anatomy, Western Reserve University, Cleveland, Ohio. The C. V. Mosby Co., St. Louis. Cloth. 548 pages, Illustrated, 3rd ed., 1959. $5.75.

In this edition the author has made many changes. He presents the essential facts of human anatomy.

The chapter on the endocrine system and the section on the autonomic nervous system have been extensively revised. Many excellent illustrations are included. Review questions follow each chapter.

This text will be useful to anesthetists, especially those in the teaching field.

A Manual of Anaesthetic Techniques. By William J. Pryor, M.B., Ch.B. (N.Z.), F.F.A.R.C.S. (Eng.), D.A. (Eng.), F.F.A.R.A.C.S., Anaesthetist, Thoracic Unit, Christchurch Hospital (N.Z.) and Late Anaesthetic Registrar, The London and Poplar Hospitals, London. The Williams & Wilkins Co., Baltimore, exclusive U. S. agents. Cloth, 228 pages, Illustrated. 1959. $7.00.

The second edition of this text has been almost completely revised. Most of the important recent changes in anesthesia are included. Emphasis is placed on the practical techniques for the different types of surgery.

The author presents the anesthetic room and equipment, the agents used, general anesthetic techniques, special techniques and hazards.

Although written primarily for House Surgeons and Registrars, it will be a practical reference for all anesthetists. Indexed.

Orthopedic Nursing Procedures. By Avice Kerr, R.N., B.A., Downey, California. Springer Publishing Co., Inc., New York. Paper, 364 pages, Illustrated, 1959. $4.75.

This manual presents detailed instruction in orthopedic care and in the use of special apparatus.

Anesthetists will find the section of Body Mechanics for nurses of special interest. It includes methods to help the nurse learn how to safeguard her health while caring for the patient.

The material is well organized and adequately illustrated.

Eye Ear Nose and Throat Manual for Nurses. By Roy H. Parkinson, M.D., F.A.C.S., Formerly Head Oculist and Aurist to St. Joseph's Hospital, San Francisco, California. The C. V. Mosby Co., St. Louis. Cloth, 237 pages, Illustrated, 8th ed., 1959. $3.85.

This new edition presents few changes since the printing of the seventh edition.

The first part presents Anatomy, Physiology and Diseases pertaining to this specialty. The second section is devoted to operating room technique, operations and instruments used. The third part discusses problems of the public health nurse.

A quiz follows most of the chapters. Many excellent illustrations and sketches are included.

Written for nurses, it will be helpful to anesthetists who are in the teaching field, as well as to the practicing anesthetist.

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Hospital Safety

Safety in Anesthetizing Locations

"Is it safe to wear the so-called 'drip dry cottons' in areas where flammable anesthetics are to be used?"

Unfortunately this can not be answered with a flat yes or no. N. F. P. A. #56 states that unmodified cotton and rayon are acceptable. Rayon is regenerated cellulose, not cellulose acetate. When these materials are modified by glaze, permanent starch or acetylated, the natural hygroscopic quality of cotton and rayon is reduced. "Fabrics of intimate blends of unmodified cotton or rayon with other textile materials are not acceptable unless tested and found to be conductive."

Companies manufacturing uniforms frequently are not the weavers of the cloth they use and therefore do not know the hygroscopic quality of the materials.

Information from the Underwriters' Laboratories, Inc. does not disclose the name of any textile mill or uniform manufacturer having submitted "drip dry cotton" for conductivity tests.

In the few instances where fabrics were tested some time ago, it was found that the starch used in some commercial laundries greatly reduced the hygroscopic quality of cotton. Also some of the so-called "drip dry cotton" has been tested privately and found to be easily electrified.

To be absolutely certain about any textile used in areas where flammable anesthetics are to be administered, "the surface resistivity of the fabric should be measured at an ambient relative humidity of 40% by method 76-54 of the American Association of Textile Chemists and Colorists. The measured values should be less than 5×10^{11} ohms (per unit square of the material)."

Facilities for this sort of testing are not likely to be found in the great majority of anesthetic departments or hospitals.

In all probability any treated cotton including the so-called "drip drys" is not likely to be safe for wear in areas where flammable anesthetics are to be administered. We would advocate that only unmodified cotton uniforms be worn.

HARRIET L. ABERG, C.R.N.A.

A.A.N.A. representative on the N.F.P.A. Committee on Hospital Operating Rooms concerned with the National Fire Protection Association's publication #56, Recommended Safe Practice for Hospital Operating Rooms.

Any questions pertaining to hospital safety may be directed to the Executive Office. Answers will be included in this section in future issues.

Legislation

Emanuel Hayt, LLB., Counsel A.A.N.A.

No Liability in Connecticut for Failure of Nurses to Use Bedrails

The plaintiff brought this action to recover damages for personal injuries alleged to have been caused, while she was a patient in the defendant's hospital, by the negligence of the defendant and its servants and agents in failing to provide the bed occupied by her with railings to prevent her from falling from it and in failing to exercise reasonable care to prevent her from falling, and by the negligence of the defendant in failing to exercise reasonable care in the selection and employment of its agents and servants. The plaintiff concedes that the defendant was a charitable organization.

The evidence was that the hospital routine was in accord with standard practices obtaining in similar hospitals. The plaintiff produced no evidence to the contrary. Although the jury may have disbelieved the defendant's witnesses, it was not entitled to conclude that the opposite was true.

Corporate neglect means neglect of the officers or managing directors who constitute the governing board of a corporation, as distinguished from the negligence of its ordinary employees, such as, in this case, the superintendent, supervisors, physicians and nurses of the defendant. If there was neglect in any of the respects alleged, but it was negligence of the employees, there is no liability on the part of the corporation. A charitable corporation is not liable for the negligence of employees whom it has selected with due care.

There was nothing in the case to demonstrate that the defendant failed to use due care in the selection of any of its employees.

The plaintiff contended that the doctrine of charitable immunity, so far as it applies to charitable hospital corporations, should be abandoned. In 1955 an effort was made in the legislature to change the law. The bill in question was reported unfavorably and rejected.

At the conclusion of the presentation of evidence to the jury, the court directed a verdict for the defendant.

(Martino v. Grace - New Haven Community Hospital, 9 CCH Neg. Cases 2d 302 - Conn.) (1959).

Negligence of Hospital Nurses Held Cause of Prolonged Bleeding of Patient in Childbirth

The husband and three children of a patient who was in the hospital for the delivery of a child sued the doctor who was in charge of her, the hospital, and two nurses who attended her after the delivery for her alleged wrongful death.

The evidence showed that the doctor, when the patient was about to deliver, had her removed to the delivery room. There he made an incision in her cervix to facilitate the delivery; a vein was severed and the cut was not sutured; this action was held by the jury to be in violation of the standard of medical care in the community.

However, conceding that the doctor was negligent, the failure of the nurses to take proper action could have contributed to the death of the patient. After the patient was returned to a room, one of the nurses did not take the patient's pulse, blood pressure, temperature, or respiration, and did not call the patient's doctor even at a time when she was aware that her bleeding was more than normal under the circumstances and despite the fact that the doctor's orders stated that he was to be called in such event. Although this nurse was "horrified" at the treatment which the doctor was giving, she did not notify hospital authorities of this fact.

Thus there was sufficient evidence to support a finding that the nurses were negligent and the hospital would be liable therefore under the doctrine of respondeat superior. Also the testimony of a doctor who practiced in a town 14 miles away and who was on the staff of two hospitals and a college infirmary was competent evidence of the standard of care prevailing in hospitals of the same type.

(Goff v. Doctors General Hospital of San Jose, 333 p. 2d 29-Calif.) (1958).

The THIRTIETH QUALIFYING EXAMINATION for membership in the American Association of Nurse Anesthetists will be conducted on November 14, 1959. The deadline for accepting completed applications including the transcripts is October 5. Notice of eligibility will be mailed about October 12.

Applications should be forwarded early enough to allow time to request transcripts and have them returned to the Executive Office before the deadline date.

The THIRTY-FIRST QUALIFYING EXAMINATION for membership in the American Association of Nurse Anesthetists will be conducted on May 14, 1960. The deadline for accepting completed applications including the transcripts is April 1. Notice of eligibility will be mailed about April 10.

Applications should be forwarded early enough to allow time to request transcripts and have them returned to the Executive Office before the deadline date.

Abstracts

Adelman, M. H., Jacobson, Elliott, Lief, P. A. and Miller, S. A.: Promethazine hydrochloride in surgery and obstetrics. J.A.M.A. 169: 73-75 (Jan. 3) 1959.

"Promethazine hydrochloride . . . was studied by us in approximately 5,000 surgical and obstetric patients. This study was undertaken to evaluate promethazine as a premedicant drug, as an antiemetic agent, and as a sedative during spinal anesthesia. . . .

"In the surgical patients, the clinical data support the following conclusions: Preanesthetic medication with promethazine, scopolamine, and reduced doses of meperidine afforded optimal sedation without significant respiratory and circulatory depressions. Promethazine practically eliminated nausea and emesis in both the preoperative and operative periods, while the incidence of postoperative nausea and emesis after general anesthesia was reduced markedly. Induction and maintenance of general anesthesia was facilitated by promethazine, which appeared to reduce requirements of general anesthetic agents. Promethazine proved to be a valuable adjuvant in regional anesthesia for effective sedation without respiratory depression, tachycardia, or hypotension.

"In the obstetric patients, the use of promethazine in the antepartum period effected excellent amnesia and analgesia, minimized nausea and emesis, produced no material depression (respiratory or circulatory), and decreased slightly the total narcotic requirements. The intrapartum and postpartum periods in these patients were characterized by a sharp decrease in nausea and vomiting during induction of and emergence from general anesthesia, smoother induction and lessened general anesthetic requirements, absence of maternal and fetal depression, and quieter emergence from general anesthesia. Side-reactions to promethazine appeared rarely. These included restlessness, localized muscular twitchings, and moderate hypertension."

Dinsdale, Howard: Use of Primicaine in intraocular opthalmic surgery. Minnesota Med. 41: 102-103 (Feb.) 1958.

"A relatively new anesthetic agent, 2' - diethylaminoethyl - 2-butoxy-3-aminobenzoate hydrochloride (Primacaine hydrochloride) has been studied by a group of investigators and used for various purposes clinically. . . . The author, under the supervision of Edward P. Burch, M.D., has recently conducted a clinical survey of Primacaine intraocular ophthalmic surgery. . . . The patients represented a consecutive, unselected, series of intraocular cases operated upon by a group of local ophthalmologists. . . .

"The trans-cutaneous method of retrobulbar injection and the Van

Lint lid block were employed throughout. Primacaine hydrochloride with epinephrine 1:60,000 and hyaluronidase 5 viscosity-reducing units per cc. were used. Two cc. of solution were used for retrobulbar injection and 2.5 cc. for the lid block. The globe was massaged following injection for a period varying from three to five minutes. . . . The clinical results indicate that Primacaine hydrochloride represents a superior anesthetic agent for intraocular ophthalmic surgery."

Lasagna, Louis and DeKornfeld, T. J.: Analgesic potency of normorphine in patients with postoperative pain. J. Pharmacol. & Exper. Therap. 124: 260-263 (Nov.) 1958.

"The present studies were undertaken to measure the clinical analgesic potency of normorphine, utilizing patients suffering from postoperative pain. . . . Patients were selected from the surgical wards of the Baltimore City Hospitals. . . . Forty females and 29 males constituted the total sample. . . . Normorphine was found to be approximately one-fourth as active as morphine. It appears unlikely that N-demethylation of morphine is necessary for the analgesic effect of morphine in man."

Lehmann, H. and Simmons, P. H.: Sensitivity to suxamethonium; apnoea in two brothers. Lancet 2: 981 (Nov. 8) 1958.

"It is impracticable to examine the plasma-pseudocholinesterase level of all patients likely, or even known, to receive suxamethonium. . . . An entirely unpredictable cause of a low cholinesterase level is a genetically determined deficiency of the enzyme. . . . We have now examined the inheritance of this defect in 14 families. The gene seems to be of different expression in different families. A single gene may be associated with a fairly low pseudocholinesterase level but the severe deficiency of pseudocholinesterase is more typical of what seems to be the homozygous state. . . .

"Two brothers . . . had a low plasma-pseudocholinesterase level and both had (one of them repeatedly) a prolonged muscular paralysis following the administration of suxamethonium. In one brother the apnoea was cut short after 90 minutes by injection of pseudocholinesterase. Whenever it is known that a person has a low pseudocholinesterase level, suxamethonium apnoea may be avoided by recording clearly this finding on the top of the patient's notes. If the low level of the enzyme is idiopathic the relatives, particularly the siblings, should be examined for a low level of the enzyme."

Therien, R. C., Lee, L. W., Malashock, E. M. and Davis, N. B.: Anileridine hydrochloride—its clinical use as an analgesic and sedative. Preliminary report. J.A.M.A. 168: 2098-2100 (Dec. 20) 1958.

"Anileridine hydrochloride is a substituted meperidine. . . . Our observations were begun shortly after the compound was synthesized in 1956 and proved to be suitable for administration to animals and man, and they have continued to this time. During this time we have given anileridine to over 600 patients. . . .

"The clinical use of anileridine as a preoperative and postoperative analgesic and sedative was observed in a study of over 600 patients. This

study showed anileridine to be a valuable addition to the present group of analgesic-sedative agents. It is effective given orally and parenterally, with a minimal amount of undesirable side-effects. Anileridine was found to be effective and well tolerated by children, as well as by patients of advanced age."

Wyke, B. D. and Frayworth, E.: Use of bemegride in terminating barbiturate anaesthesia. Lancet 2: 1025-1028 (Nov. 23) 1957.

"Bemegride . . . ("Megimide") reverses, to a large extent, the narcotic effects of barbiturates in laboratory animals. . . . It is widely used in barbiturate poisoning. . . . Apart from short notes by Harris (1955) and by Bentel et al. (1956), its use as an anaesthetic antidote has not been reported so far, though such an antidote would be useful to the anaesthetist. . . .

"Fifty-two consecutive patients, ranging in age from 7 to 84 years, were anaesthetized by one of us by a technique similar in each case. . . . The findings leave us in no doubt that bemegride is an effective, safe and clinically useful antidote to barbiturates employed as anaesthetic agents. . . .

"Bemegride accelerates considerably recovery of respiratory function, corneal reflexes, and oropharyngeal and somatic reflex responses. It has little specific effect on full recovery of consciousness, although it does diminish the depth of unconsciousness. Toxic effects of bemegride are rare with the doses required to produce these effects. Bemegride appears to act primarily as a stimulant to the reticular nuclei of the brain-stem."

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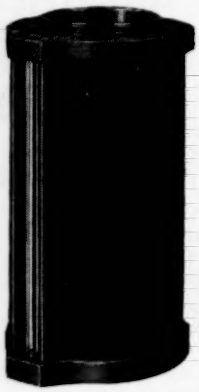

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NURSE ANESTHETIST — Female: Accredited modern 250-bed hospital, all new surgery wing. Department directed by Anesthesiologist. Starting wage $500 plus liberal annual increase, three weeks vacation, health insurance, sick leave, retirement plan. American Board surgeons. Apply to Elmer J. Berg, Business Manager, Gundersen Clinic, 1836 South Ave., La Crosse, Wisconsin.

NURSE ANESTHETIST: 500 bed hospital, Anesthesia Department consists of two M.D.'s and thirteen Nurse Anesthetists. Write to Medical Director, Crawford W. Long Hospital, Atlanta, Ga.

NURSE ANESTHETIST: 93 bed fully accredited general hospital on Southeastern coast. Salary open. Usual fringe benefits. Two in department. No surgery scheduled Saturday or Sunday and no O.B. call. Average 100 cases per month. Apply Box B-32, Journal American Association of Nurse Anesthetists, Prudential Plaza, Suite 3010, Chicago 1, Ill.

NURSE ANESTHETIST — Immediate opening in new 125-bed general hospital. Salary open. Contact W. W. Lamont, Administrator, The Franklin Hospital, Benton, Illinois.

NURSE ANESTHETIST: 40 hour week—200 bed hospital. Apply to Donald Love, M.D., Anesthesiologist, Evangelical Deaconess Hospital, 3245 E. Jefferson Ave., Detroit 7, Michigan.

ANESTHETIST—330 bed voluntary general hospital—not tax supported. Modern air-conditioned surgical suite. Excellent working conditions. Room and board available if desired. Staff consists of 6 nurse anesthetists under supervision of 3 anesthesiologists. Salary open. Apply Decatur and Macon County Hospital, Decatur, Illinois.

WANTED: 2 Registered Nurse Anesthetists for 60 bed hospital, conveniently located near the coast with access to several fine beaches. Salary for qualified person is $7200 per year plus commission. For further information contact Douglas - Coffee County Hospital, Douglas, Georgia at once.

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WANTED—Nurse Anesthetist to join staff of three physicians and 3 nurse anesthetists in lower Connecticut. Prevailing Connecticut salary—liberal vacation and sick leave. Reply Box B-30, Journal American Association of Nurse Anesthetists, Prudential Plaza, Suite 3010, Chicago 1, Ill.

NURSE ANESTHETIST—Excellent working conditions, starting salary $450.00 to $550.00 depending on training and experience. Liberal vacation, sick leave and other employee benefits. Lexington is located in "The Heart of the Bluegrass" famous for horse racing and tobacco industries, home of the University of Kentucky and Transylvania College. Apply, Assistant Administrator, Methodist Good Samaritan Hospital, S. Limestone St., Lexington, Kentucky.

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NURSE ANESTHETIST: General Hospital, 700 beds. Starting salary, $4500 per annum. Maximum, $5000. Twelve (12) holidays, paid vacation and sick time allowed. Full maintenance provided. Address: S. Bongiovanni, M.D., Chief Anesthesiologist, Martland Medical Center, Newark, N. J.

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NURSE ANESTHETIST, to fill vacancy on staff of 495 bed General Hospital. New, modern operating room facilities, good hours, salary based upon experience, free hospitalization insurance, meals and laundry. Contact Director Anesthesia, Norfolk General Hospital, Norfolk 7, Virginia.

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REGISTERED NURSE ANESTHETIST: For 61 bed General Hospital. Staff of two Nurse Anesthetists maintained to compensate for call hours and weekends. Liberal personnel policies. Full maintenance provided in adjoining residence. Apply stating salary expected to: Margaret Vopni, R.N., Administratrix, Grafton Deaconess Hospital, Grafton, North Dakota.

NURSE ANESTHETISTS for 220 bed community hospital. Working with private group. Two full time M.D.'s, four nurses, all agents and techniques. Modernization program going on. Two and one-half hours from Boston and New York. Write G. J. Carroll, M.D., William W. Backus Hospital, Norwich, Connecticut.

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NURSE ANESTHETIST to complete staff of five for 260 adult bed hospital, expanding to 500 soon, located near business district, Akron, Ohio. Surgery and OB. No call except relief. Forty hour week, extra for over-time. Four weeks vacation after year. Base pay after boards $450.00, qualifications and experience govern salary offer. Apply: Administrator, St. Thomas Hospital, 444 N. Main St., Akron, Ohio.

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M.A.A.N.A. FEMALE — 200 bed General Hospital in a prominent, intellectual center. Attractive living quarters, meals and laundry provided. Operation and Delivery rooms air-conditioned. Five Anesthetists rotating weekend call. Month vacation, seven holidays yearly, excellent salary. Princeton Hospital, Princeton, New Jersey, Therese C. Trupp, Chief Anesthetist.

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ONE NURSE ANESTHETIST desired. C.R.N.A. preferred. Surgery, no OB call; expanding OR Suite. Midwestern town. Salary pending qualifications. Write: Administrator, St. Mary's Hospital, Galesburg, Ill.

WANTED: Nurse Anesthetist, salary approximately $450.00 per month, opening May 1, 1959. For further information, write W. Forrest Powell, M.D., University Hospital, Alcoa Highway, Knoxville, Tennessee.

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REGISTERED NURSE ANESTHETISTS: $5400 - $6000 annually. Extra pay when on call and for overtime. 44 hour week. Four (4) weeks vacation. Social Security and Retirement Plan. 450 bed hospital affiliated with Medical College. For further information write to John C. Doerr, M.D., Director, Department of Anesthesiology, Roper Hospital, Charleston, S. C.

NURSE ANESTHETIST: To increase present staff. Salary A.A.N.A. member $430 per month with three annual increases plus laundry and room with private bath and telephone or allowance if living out. Social Security; pension plan; 40 hour week including call time; six paid holidays; month annual vacation; liberal sick leave policy. Apply: Marshall Kerry, M.D., The Reading Hospital, Reading, Pennsylvania.

NURSE ANESTHETIST, 150 bed hospital, fully approved, good working conditions and fringe benefits, salary open. Apply: Administrator, King's Daughters' Hospital, Staunton, Virginia.

NURSE ANESTHETIST: Salary $474.50 to $541.67 per month plus liberal fringe benefits. Case compensation for over-time. Easily make $750.00 per month. Apply Director of Anesthesia, Pontiac General Hospital, Pontiac, Michigan.

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ANESTHETISTS—Immediate openings in a chain of ten General Hospitals located in the coal mining communities of Eastern Kentucky, Southwestern Virginia and Southern West Virginia. Salary at the rate of $5880 or $7080 per annum, depending upon background and experience, annual increments, 4 weeks paid vacation, 7 paid holidays, sick leave, noncontributory retirement plan plus Social Security. Write to: MINERS MEMORIAL HOSPITAL ASS'N. Box #61, Williamson, W. Va.

WANTED: Additional Nurse Anesthetist desired for 82 bed accredited General Hospital. Minimum salary $600.00. Accredited School of Nursing. Progressive Western Nebraska community of 15,000. Excellent opportunity. Write Max C. Coppom, Administrator, West Nebraska General Hospital, Scottsbluff, Nebr.

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INDEX TO ADVERTISERS

Abbott Laboratories 153
Ayerst Laboratories 155
Burgess Publishing Co. 219
Burroughs Wellcome & Co. 210
Ciba Pharmaceutical Products, Inc. 151
Linde Co., A Division of Union Carbide Corp. ..... IBC
Maginnis and Associates 213
Mallinckrodt 162
Ohio Chemical & Surgical Equipment Co. 158, 159, 227
Parke, Davis & Co. 149
Pharmaseal Laboratories 157
Puritan Compressed Gas Corp. 160, 161
H. E. Richards Company, Inc. 220, 221
Union Carbide Corp., Linde Co. ..... IBC
Classified Advertisements 222

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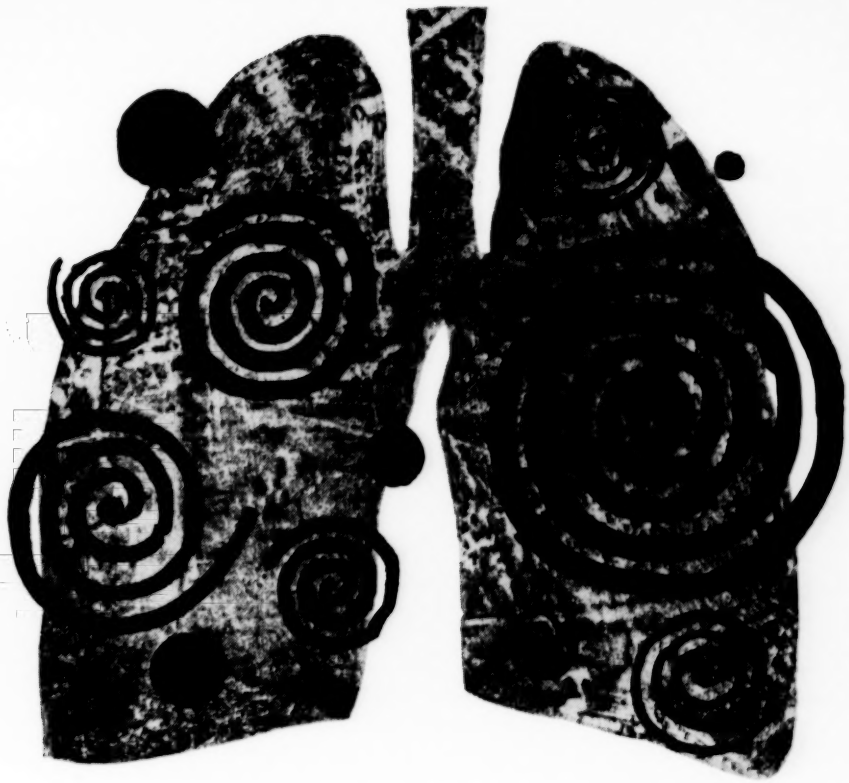

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